THE

QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

NEW SERIES.

VOLUME III.

JANUARY TO JUNE, 1915.

BY AUTHORITY:
ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1915.

QUEENSLAND AGRICULTURAL JOURNAL.

VOL. III. PARTS 1 TO 6.

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QUEENSLAND AGRICULTURAL JOURNAL

Vol. III. JANUARY, 1915. Part 1.

THE PAST YEAR.

Notwithstanding the disastrous war in Europe and elsewhere and the destruction of peaceable merchant ships with the consequent dislocation of trade by raiding cruisers of Germany, a retrospect of the past year gives cause for congratulation on the results of agricultural and pastoral operations throughout the State. Ever since the memorable drought which—after operating disastrously on all rural industries for several consecutive seasons—terminated in 1903, Queensland has enjoyed, if not absolute immunity from droughts, at least a practical continuance of good seasons. At times when crops were on the verge of perishing for want of rain, and when sheep and cattle were on the eve of being removed to relief country, bountiful rains occurred just in time to avert any severe losses. Such has been the case during the latter half of the past year, when the early wheat and maize crops especially suffered in the early stages of growth owing to a dry spring and the lateness of the summer rains; but good rain fell in many districts in time to save the great bulk of the crops; whilst at the latter end of November bountiful rains were experienced over almost the whole of the State.

To show how wonderfully the Queensland soil responds to a good season; consider the last years before the termination of the great drought some twelve or thirteen years ago in 1903.

In 1902 the State exported 552,625 lb. of butter, valued at £24,610; in the following year these figures were exactly doubled; and in 1904 the increase of the butter export was phenomenal, as it amounted to 9,520,921 lb., of a value of £344,943. From that time forward the production and export of butter regularly increased until the dairying

industry has reached a position when the value of it can be referred to in millions, the value for the year 1913-1914 being estimated at £2,500,000. Yet the year did not open favourably for the production of dairy products, as almost every district suffered from a comparatively dry spring and the summer rains were later than usual.

As regards the progress of agriculture proper, there are to-day nearly 1,000,000 acres under actual cultivation, which is an increase of 48 per cent. on the area cultivated in 1903. Owing mainly to the expansion of the dairying industry, there was a smaller area under wheat during the past year than in 1904, when 150,958 acres produced 2,149,663 bushels of grain. For the 1913-1914 crop 132,665 acres were sown, which yielded 1,769,432 bushels.

The sugar industry, although labouring under some disabilities, which it is not our province to discuss in this Journal, has largely progressed during the year. We do not yet know the results of the crushing for 1914, but, owing in some cases to frosts and in others to the dry spring, the total yield will probably fall some 40,000 tons short of the State's requirements. The record sugar year was 1913, when 147,743 acres were under cane. Of this area, 102,803 acres were cut for crushing, returning 242,837 tons of 94 per cent. net titre sugar.

During the past year much more land has been placed under cane, especially in the North, where a large new mill has been erected at Inkerman, on the Lower Burdekin, and is already at work. A central mill is being erected at Babinda, which will be ready for the 1915 crop; and a third will be established at Durradgee, near Innisfail, which will probably be at work in 1916.

The present 47 sugar mills, 2 refineries, and 1 juice mill afford employment to nearly 5,000 hands; whilst the industry generally gives employment directly to some 50,000 employees of various grades, and indirectly, earning their living by sugar handling, the number may be reckoned by many thousands, including waterside workers, men engaged in transport of cane and sugar, seamen, and a host of others whose livelihood depends wholly or in part on the sugar industry after the raw sugar has left the mills. The number of plantations, excluding areas under 5 acres, is 3,982—an average to each planter of 37 acres, and an increase in number of 81 plantations above those of the previous year.

Taking the returns from all our industries as set forth in the Annual Report of the Department of Agriculture and Stock for the year 1913-1914, we see great cause for congratulation, and a great incentive to a stimulation of immigration from Great Britain, Canada, the United States, and possibly from countries now allied with the United Kingdom.

Agriculture.

EXTENSION OF AREA UNDER WHEAT FOR SEASON 1915—GOVERNMENT ASSISTANCE TO WHEAT-GROWERS.

In November last a letter was received by the Department of Agriculture and Stock, in which it was asked whether the Department intends to take any responsibility or risk with the result of the ploughing and sowing, and also if the Department has any views on the preparation of land for wheat. Deep ploughing, it was stated, has been a failure this year (1914) on the Downs, and the best crops have been grown on the drier areas, where the land was simply cultivated with a spring-tooth or disc cultivator.

In reply, it was assumed that the writer desired to know whether this Department will guarantee any price for wheat raised, and he was informed that the assistance offered by the Minister does not extend beyond the ploughing and preparation of the land and sowing of the crop.

With regard to the question raised as to deep *v.* shallow ploughing, and advice as to subsequent treatment of the land to ensure a crop, this is being dealt with direct by the different Agricultural Instructors, who have been engaged for some time past in tendering what assistance it is possible to give to wheat-growers.

One provision in connection with advances has relation to the ploughing up of the land by the 28th February next, this being done for the purpose of putting it into condition to trap the summer rains and admit of their percolation into the subsoil. Deep ploughing at this stage is not advocated for obvious reasons, and the advice tendered by the Department is strictly in the direction of the conservation of soil moisture by judicious cultivation on recognised dry-farming principles.

We wish to draw attention to the following conditions under which financial assistance will be given to farmers who may require it, and who are invited by the Minister for Agriculture to make application for it:—

"Each application will be subject to inquiry, and will be decided by the Minister upon the merits of the case.

"Financial assistance will be given for the following purposes:—

1. For increasing the area under wheat over and above the area planted by owner or occupier during 1914. Assistance in this respect will only be given where the land has been or can be ploughed by the 28th February, 1915.

2. For planting new land where wheat has not before been grown.
3. For the supply of seed for planting.
4. For the hire of horses or machinery.
5. For the payment of extra labour required.

"All farmers who desire assistance should be particular in furnishing the information concerning the assistance required, so that there may be no delay in making the necessary inquiries.

"Applications are to be addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than the 10th December, 1914."

PICKLING WHEAT.

There are three methods of pickling wheat to destroy or prevent the germination of the spores of smut. The most commonly used pickles are:—(1) A solution of formalin; (2) Sulphate of copper (bluestone); (3) Plain hot water. The solutions are:—Bluestone at the rate of 1 lb. in 5 gallons of water, or formalin at the rate of 1 lb. in 40 gallons of water.

The seed, in either case, may be spread on a wooden floor and the solution sprinkled over it, turning the grain over and over either by shovelling or raking, so that all the grains become thoroughly wetted. The seed is then spread out to dry, and, if left in a thin layer over night, it is ready for sowing in the morning. Instead of sprinkling, which is wasteful, dipping may be resorted to. A bushel or so is placed in a bag and dipped in the solution, taking care that all the grains are thoroughly wetted by shaking the bag and plunging it in and out. In the case of bluestone only a minute or two is necessary for the dipping process, on account of its corrosive action; but in the case of formalin five minutes may be allowed, and it is less injurious to the grain, the cost being about the same as for the bluestone process. Both processes are equally effective in destroying the smut germs. The bluestone solution may be used again and again, but formalin is volatile, and it follows, therefore, that only the amount of formalin should be prepared that is required for immediate use, and sprinkling in this case should be preferred to dipping. Formalin is poisonous, and must be kept where there is no chance of children or others obtaining it in ignorance of its nature: 1 gallon of formalin solution is sufficient for 4 bushels of seed. For the hot-water treatment, two boilers are needed, containing water at 120 degrees Fahr. and 135 degrees Fahr. respectively. A smaller vessel containing boiling water and an abundant supply of cold water should be at hand. The seed to be treated may be placed in a gunny bag or in a perforated kerosene tin. Plunge the vessel containing the grain into the first boiler (120 degrees Fahr.), and move it about for a minute or two till the grain has all been warmed. Take care to keep up the temperature. Then plunge it into the second boiler (135 degrees Fahr.). Leave it there for ten minutes, moving it about and agitating the grain. Then take it out and plunge it into cold water, and then spread it out to dry, after which it is ready for sowing.

LIME WATER.

Mr. H. Ross, in an article on "The Treatment of Seed Wheat for the Prevention of Bunt or Stinking Smut," in the "Agricultural Gazette of New South Wales" (2nd March, 1914), advises:—

"The action of the bluestone during the process of pickling is that it kills the tiny spores or seed of the bunt which adhere to the outside of the grain. Now, while bluestone has the power to kill these spores it has also the power to impair the vitality of the grain, and even to kill the germ. To guard against this, the following measures should be observed. If there is no prospect of immediate germination—that is, if a 'dry' sowing is made, the bluestoned wheat should, after having been allowed to drain for from 10 to 15 minutes, be dipped into a solution of lime water, which is made by stirring ½ lb. of freshly burnt lime into 10 gallons of water. This mixture is allowed to settle; then the clear lime water is decanted, and into this the bluestone-treated seed is dipped for from 2 to 3 minutes. The lime neutralises the effects of the bluestone, and so preserves the full vitality of the wheat germ. If, on the other hand, a 'wet' sowing is made and an immediate germination of the seed is likely to follow, then there is little need to dip the bluestoned wheat into lime water.

When using lime water care should be taken to make a fresh mixture now and again, as the constant dipping of the bluestone-saturated butts of wheat into the lime water will change this eventually from an alkaline into an acid solution, in which case it would be useless; and for that very reason bluestone and lime should never be mixed together in a solution used for pickling wheat.

The chief advantages gained from using lime water, in addition to bluestone, are:—Firstly, that a farmer following this practice is in a position to pickle all his seed wheat, say, in March, ready for sowing in April and May, without running any risk of the germination being affected; secondly, that a better germination will be obtained if the sown seed should lie in the ground for some time before rain falls and germination takes place.

Little extra trouble is involved in the bluestone-lime treatment, and farmers are strongly advised to adopt this method in preference to the bluestone treatment only."

Should it be found impossible to obtain freshly burnt lime, it is recommended that ½ lb. of slacked lime be mixed with 10 gallons of water, thus making milk of lime, into which the butts of the bluestoned wheat should be dipped for a period of from 2 to 3 minutes.

Milk of lime differs from lime water in so far that in the former the particles of lime are not dissolved but held in suspension, whereas in the case of clear lime water the particles are dissolved.

[The above was published in the March (1914) issue of the Journal; but as many new subscribers are writing for information on the subject, in view of the wheat-sowing season of 1915, we republish it for the general benefit of intending wheat-growers.—Ed. "Q.A.J."]

A MARKET FOR SUNFLOWER SEED.

There is nothing more easy to grow as a farm crop than sunflowers, but, apart from their ornamental character, one never thinks of these plants as being of any use to the cultivator. Although the plant has never been cultivated on a commercial scale in Queensland—except, as far as we know, by Mrs. H. E. Waller on the Binjour Plateau, Gayndah, about five years ago—there is no reason, except, perhaps, prejudice, why it should not be a staple crop for Queensland. Why it has been so long neglected by Australian farmers it is difficult to say, considering that it is grown to an enormous extent in Germany, Hungary, and Russia, and the demand is always greater than the supply, notwithstanding the fact that each seed sown produces 1,000 or more, and the price ranges from £10 to £11 per ton. The most profitable sort to grow is the Giant Russian, of which each head contains from 1,000 to 2,000 seed, and even as many as 3,000 seeds per head have been harvested in Russia. The plant is admirably adapted to the soil and climate of Queensland. It thrives as well in the dry West as on the Darling Downs and on the Eastern coast lands. It is not particular as to soil, but succeeds best on deep well-drained loam, whether scrub or forest or plain. It does well on maize lands; and as the plant needs a lesser rainfall than maize, and is a much quicker grower, the crop requires less cleaning owing to its giving more shade, thereby lessening the growth of weeds, which means considerably less work to the farmer. From 4 lb. to 5 lb. of seed is sufficient to sow an acre at distances between the rows of about 3 ft. and in the rows about 12 in. to 18 in. from plant to plant. The return may be set down at about 50 bushels per acre. Sunflowers grow very rapidly, the crop being usually ready to harvest in three months.

The harvesting is a very simple matter. Mrs. Waller says that on ploughed ground a tip dray can be used provided with a frame covered with bag. The dray passes along the middle of the rows—one row on each side. The heads are cut and thrown into the dray. They are then driven to a convenient place in a paddock where there is a box, about 4 ft. high by 3 ft. square, with a wooden batten nailed on about 9 in. from the top inside on which the heads are "banged," when all the seed which is fully ripe and good falls into the box. The seed is then winnowed. Two men cutting into the dray can keep one man threshing.

Mr. Henry A. Tardent, in a paper on "The Sunflower," published in this Journal in October, 1899, said that "a very expeditious way to harvest it is to cut the stem close to the ground by means of a horse corn-cutter, and to cart home stems and heads together. The heads should be then dried as quickly as possible, and as soon as dry enough they can be threshed, winnowed, and bagged."

The seed is rich in oil, and yields 34 to 50 per cent.; whilst the oil cake forms an excellent food for stock. The best time to sow the seed is from September to February, inclusive.

As to a market for the seed, we are informed by Mrs. Waller that a payable market can be found for seed grown under contract for the firm of Messrs. Paten and Co., 60 Queen street, Melbourne, to whom she

consigned all her crop. This firm, writing to her, said: "If you know of anyone who has the necessary soil and climatic conditions for growing Black Sunflower seed, see if they will quote a price per ton for 10 to 50 tons f.o.b. Brisbane."

Under the present war conditions, when the seed probably cannot be obtained from Russia or Hungary or Germany, this might be a good opportunity to establish a new industry in Queensland.

CORN COBS AS FODDER.

The subject of ground corn cobs as a food for stock has given rise to much controversy, especially amongst the farming community in the United States of America, some farmers asserting that once the grain is removed the cobs are of no value, whilst others as positively assert that they possess high nutritive properties. As there are many tons of cobs annually thrown away or used instead of firewood in this State, it becomes a matter of very great importance to farmers to know whether they are thus destroying a valuable fodder material, or whether the cobs are, as supposed, absolutely useless as feed for stock. To decide this question, the Department of Agriculture, so far back as 1899, requested Mr. J. C. Brünnich, Agricultural Chemist to the Department, to furnish an analysis of the corn cob, and show its value and properties as a fodder. Mr. Brünnich, having made the analysis, furnished the following information, from which it will be seen that, taking the comparative food values, commencing with corn as 100, of certain food materials, lucerne hay come second and corn cobs third on the list, corn stalks fourth, and potatoes fifth, &c. In his report Mr. Brünnich remarks that corn cobs, as well as corn stalks, have a considerable value as food, as shown by the following analysis:—

—		Albuminoids per Cent.	Digest. Nutrients Carbo-Hydrates per Cent.	Fat per Cent.	Comparative Value.
Corn cobs	from	·6	41·7	·2	37
	to	1·1	43·2	·4	49
Corn stalks		1·1	37·0	·3	36
Corn		8·4	60·6	4·8	100
Potatoes		2·0	21·8	·2	26
Lucerne hay		9·4	28·3	1·0	65

Professor E. W. Stewart, in his "Feeding Animals," recommends strongly to pass the whole corn crop—stalks, ears, and all—through a large cutter and reduce it to a fine chaff.

Corn cobs may be ground by themselves to a fine bran-like mass; but the process is slow, and it is questionable if it would pay here.

That corn cobs, which in Queensland are universally a waste product, have a very considerable value as stock food has been demonstrated in the long-continued general experience of American farmers. The following table of analyses will serve to show how in chemical constituents the corn cob compares with corn and two common fodders:—

—	Water.	Ash.	Albuminoid.	Fibre.	Nitrogen (Free Extract).	Fat.
Corn	13 93	1·25	8·82	1·59	70·48	3·92
Corn cob	9·25	1·16	1·91	31·22	55·86	0·60
Oat straw	12·50	1·81	2·30	55·96	26·42	1·00
English hay	14·30	4·70	7·00	26·90	45·40	1·70

These figures do not show the whole value of the cobs as a feed. Cobs are never fed alone, but generally with the corn which grew on them. When fed thus, the cob seems to be admirably suited to act as a balance to the more concentrated grain. Moreover, three-fifths of the ash of the cob is potash—an element of undoubted value as an aid to digestion. As a result of experiments, made with 10 pigs and 20 bullocks, to test the question of the food value of cobs, it was found that 1 lb. of corn cob, when ground and fed with the corn which grew upon it, was worth more than 1 lb. of meal made from corn alone. In other words, both the pigs and bullocks gave better returns from corn and cob meal than was obtained from feeding clear corn meal. Considering the large proportion of ear corn that is cob (18 per cent.), this fact of the feeding value of cobs is a matter of no little importance where, as in Queensland, corn and hay in all its forms have a very high market value. This, however, should be borne in mind: That the cob must be ground fine—quite likely the finer the better; and to grind a given amount of whole ears of corn will require three times as much power, or its equivalent in time, as is needed in reducing the same amount of shelled corn.

THE FOOD SUPPLY QUESTION.

In war time, and especially during preparation for war, the intending belligerent countries pay particular attention to securing as large a supply of provisions as possible. As a writer in the "Pastoral Review" puts it:—"Without the agriculturist there could be no war—at least, no war of any duration. The life of an army depends mainly upon its supplies; and if those supplies can be brought forward with regularity and in sufficient quantities, the army so served possesses a very great advantage over opposing forces inadequately and irregularly supplied. The staple foods of armed forces (men and horses) are the products of the land—wheat, maize, fodder, and meat; and one of the first precautions taken by a nation at war is to ensure as large a supply as possible of these commodities."

Writing in the London "Daily Mail," the Paris correspondent of that paper gives interesting facts and figures with reference to Germany's food problem:—

"Already there come from Berlin stories of a hungry population seeking food in shops that have been emptied by the panic of well-to-do people. Already the shadow of famine is said to be darkening the summer sky in every German city. These tales must be received with doubt. Unless they had large stocks of food, the Germans would not have challenged Europe so boldly. Whenever it becomes necessary, the Government of the Kaiser, by virtue of martial law, will seize all food supplies and distribute them equally.

"Nevertheless, the situation of Germany is such that it will be hard for her to carry on a war for two months without starving her town populations, and impossible for her to fight on into the winter unless she can keep the sea open for her merchant ships.

"From being a country in which the people were mainly tillers of the soil, Germany has become a country of great cities and dwindling farmer population. Nearly half of Germany's 68,000,000 live in towns. Out of her own resources Germany can only provide 86 per cent. of her people's nourishment.

"She buys the bulk of her wheat from Russia; that market is closed. She is a good customer for Roumanian wheat; but even if Roumania remains neutral, and is willing to sell, how are cargoes to be shipped? All ships bound for German ports are fair game to the navies of Britain and France.

"To send wheat overland would raise the price, and there is danger of railway lines being cut. Germany's chances of getting supplies from her usual sources are poor. Equally small is the likelihood of drawing upon the United States.

"The only German frontiers that remain open are those parting her from Italy and Austria-Hungary. Hungary may send some cattle, and will continue, so long as Munich can pay for it, to supply barley for making beer. But neither she nor Austria has any great quantity of wheat to spare. Through Italy, Germany might receive a certain amount of food for her sharp-set millions, but it can be only a limited amount. Italy has not much to sell, and grain ships making for Italian ports will be suspects. Few owners will care to take the risk.

"In any case, even if Germany could find purveyors ready to supply her needs, the whole matter is governed by this question: Can she pay? Her war chest is known to be full at this moment, but her expenses are enormous. It is reckoned that the cost of the war can scarcely be less than £12,000,000 a day spread over Europe. Germany's share of this, I am told by competent authorities, is between £3,000,000 and £4,000,000; she is exporting nothing; she is unable to borrow. Suppose, for the sake of argument, that she could find merchants ready to sell to her, they would not sell except for gold paid immediately. How long will she have gold enough to pay?

"Her annual imports of food and drink cost £162,000,000. That is a surprising figure, when we recollect that ours cost us not so very much more. We are accustomed to think of ourselves as a nation entirely depending upon outside supplies, and of Germany as almost self-supporting. Among her imports, luxuries account for a good many millions; but the same is true of us. Allowing for foods and drinks which are in no way necessaries, the fact remains that Germany depends upon foreign markets for a large part of her people's daily bread.

"She needs at least £12,000,000 worth of food supplies a month. Admit that she can pay for them, the query still comes: Where can she buy them, and how bring them to hungry mouths?

"It must be plain to everybody that Germany could not agree to any proposal that the strength of fleets should be fixed to remain at their present ratio. She saw the impossibility of making war safely unless her navy were powerful enough to keep the seas open to her commerce.

"What decided her, then, to make war unsafely? The belief, it would seem, that she could by a series of knock-out blows sweep everyone out of her way. The alternative to that is famine."

How does the case stand with Great Britain and the Allies? It is said that the German women are competent farmers and can carry on the usual agricultural occupations without the male workers; but, for all that, if there are no men to grow the crops, drive machinery, and perform the necessary heavy labour connected with the production of agricultural and pastoral supplies, and if there are no means of importation, a country cannot hold out for any lengthened time. Here it is that the United Kingdom and her Allies possess such a tremendous advantage over Germany. To again quote the "Pastoral Review":—

"Every care is taken that all available stock in the Empire shall be at her [Great Britain's] service. Export of grain and meat, in our own case, to other countries is prohibited; and the Government possesses the power to supply her own needs as occasion arises. Thus, a country without the men to grow the crops, &c., and without the means of importation, would not be able to hold out for very long; and this is where Great Britain and her Allies possess such a tremendous advantage over Germany. Great Britain's numerous colonies can grow and export food for the armies without the slightest hindrance as long as the German fleet is kept off the seas; but, on the other hand, Germany is so situated that she can import very little. She can certainly—as long as the Allies are kept out of her country—grow crops, although, apparently, every available man has been called to the colours, because the German women are competent farmers, and quite capable of doing that part of the men's work."

But the British oversea dominions have it in their power to enormously increase the area under cereals and other food crops. In this State of Queensland, under present labour conditions, it is reasonable to argue that farmers may not be in a position to very largely extend the areas devoted to the raising of food crops; but the Government, being fully aware of the difficulties, has swept them away by coming to their assistance by making advances to enable them to put additional areas under crop, by arranging for supplies of seed wheat, and generally doing all in its power to aid them in the task of production of such crops as may be exported for the use of the armies in the field, and for general distribution amongst our kindred in the old country. It is satisfactory to know that this offer of the Government is meeting with considerable response, even to the extent of sowings of 600 acres by individual farmers.

WHITE MAIZE.

The question of the relative merits of white and yellow corn has been discussed in the American Agricultural Press and at innumerable farmers' meetings in that country at frequent intervals. From the chemical standpoint, the colour seems to have no special significance. Upon the question of relative productiveness, opinions have been rather evenly divided, and, although of the tests made at seven agricultural experiment stations, six report greater yields with white than yellow varieties, it does not, therefore, follow that all white varieties will yield more than all yellow ones. Numerous yellow varieties are fully as productive as many white ones. If the best varieties of white and yellow were compared, the relative difference would probably be slight. Yet all tests go to show that it is usually possible to secure greater yields from white than from yellow varieties.

As far back as the sixties, white maize was grown to some extent on the Brisbane River, Oxley Creek, and other farming districts in the neighbourhood of Brisbane; but this was mainly with a view to grinding it into maize meal, which was often mixed with flour for bread-making. The maize was ground at Messrs. Pettigrew's mill, at Brisbane. But this variety was not favoured by buyers owing to its susceptibility to the attacks of weevil, which did not admit of its storage for any length of time—in fact, the corn was frequently attacked by the weevil even before husking in the barn.

Another point as regards white maize is that it is very liable to cross-fertilisation by yellow varieties, and hence requires to be grown at some distance from yellow varieties; and where, as in the case of small farms, such segregation is impossible, a pure white maize is unlikely to be produced.

The Department of Agriculture instituted last year an inquiry into the White Maize question; and it was found that, in 1913, 472 bushels were ground in metropolitan mills into meal, yielding 47 tons valued at £423, and 109 tons of cornflour were manufactured valued at £3,435. These figures do not appear to point to any large demand for the white variety of maize, and offer no encouragement for increasing the cultivation.

We have mentioned the use of maize meal mixed with wheat flour for bread. According to Bowman and Crossley, "Flour so adulterated yields fewer loaves than an equal amount of pure wheat flour, and the bread produced is more moist than wheat bread and has a tendency to be sodden. An addition of 10 per cent. of maize flour is calculated to mean a reduction of five loaves on the sack." Another point is that, in the writer's experience, the admixture of maize meal with flour causes the bread to quickly become dry, if kept for any undue length of time, as is sometimes necessary in the bush.

Several articles are prepared from maize—notably cornflour, maizena, maize starch, maize oil, and, more largely, glucose, which is prepared from maize starch by conversion into grape sugar, and is used largely as an adulterant for cane sugar. In Melbourne a large glucose factory has been established, capable of treating 150,000 bushels of maize per annum.

The Department has imported some of the choicest varieties of white maize from America from time to time, and recently secured 2 bushels of seed of a standard type ("Boone County White") from Kansas, U.S.A., with the express object of raising seed grain for next season's planting, with a view to supplying farmers with reliable seed.

Amongst the white varieties, Hickory King is a very valuable and reliable field corn, having a large grain, and is the smallest cobbed pure white Dent in the world. The grain is so large and the cob so small that, by breaking the ear in half, one grain will cover the entire end of the cob. The ears grow 7 to 9 in. in length and 6¼ to 6½ in. in circumference, and are generally borne 3 to 6 on one stalk, thus making it enormously productive. It ripens early, maturing in 110 days from planting. It is particularly adapted to and will yield more in thin soils than any other variety of field corn, and, if planted on good soil, will bear much closer planting than other varieties, as the stalks are of medium growth. Wherever it has been grown it has given universal satisfaction.

FOOD VALUE OF MAIZE AS COMPARED WITH WHEAT.

[Compiled from Burtt-Davy's Recent Publication on Maize.]

Prepared in various ways, maize forms an important article of diet for the American people.

Considered as a food, maize is highly nutritious, digestible, and, when properly prepared, is wholesome. The total amount of digestible

nutrients is only excelled by wheat, the latter containing, approximately, 2 per cent. more than the former.

TABLE SHOWING DIGESTIBLE NUTRIENTS IN 100 LB. OF WHEAT AND MAIZE.

—	Protein.	Carbo-Hydrates.	Food.	Total.
Wheat	10·2	69·2	1·7	81·1 lb.
Maize	7·9	66·7	4·3	78·9 lb.

Two kinds of meal are usually prepared from maize—

(1) Whole meal, in which the embryo is ground up with the endosperm;

(2) The new process meal, in which the embryo as well as the hull is removed by special machinery.

Owing to the amount of oil it contains, the old-fashioned whole meal does not keep as well in hot weather as the new process maize meal, for the embryo holds 82 per cent. of the total oil-content of the grain, but the higher oil-content, on the other hand, adds greatly to the food value in cold weather.

Ordinary maize meal is classified into white and yellow, and graded into coarse, medium, and fine.

CONSUMPTION IN THE UNITED KINGDOM.

Of the maize meal exported from the United States of America in 1904, 21.32 per cent. was sent to the United Kingdom.

ARTICLES PREPARED FROM MAIZE.

Cornflour, maizena, &c., consist mainly of starch, much of the proteid and mineral matter having been removed by treatment with dilute alkaline solutions. These forms of maize starch are used largely in the preparation of puddings, blancmanges, &c.

Maize Starch.

The finer qualities are largely used as substitutes for arrowroot. Maize starch is used as an adulterant to wheat flour, and is sold at a correspondingly low figure; but the pure food laws of most countries require that the fact of the mixture is clearly defined. We have already stated that glucose is the largest single product prepared from maize starch, which is used as an adulterant for cane syrup, or is put up as corn syrup, when this latter has been sweetened with a small percentage (10 per cent.) of cane syrup.

The varieties of white maize now under cultivation in Queensland are all more or less adapted to coastal conditions.

Pastoral.

SPECIFICATION OF LABOUR AND MATERIAL REQUIRED IN THE CONSTRUCTION OF A SHOWER SPRAY FOR THE TREATMENT OF 250 SHEEP PER HOUR, AS RECOMMENDED BY THE DEPARTMENT OF AGRICULTURE AND STOCK.

The size of the tray shown on accompanying plan is 13 ft. 6 in. long by 6 ft. 6 in. wide, and this will regulate the position of the posts and fences accordingly.

Posts should be of sound hardwood (Ironbark preferred) 6 in. in diameter, 9 ft. long, set 3 ft. in the ground perfectly plumb every way, and filled in and well rammed.

Top plates may be of 6-in. round timber, checked, scarfed, and bolted into posts, or 5-in. by 4-in. sawn hardwood checked and bolted to posts, as may be most convenient.

Joists on top to be 6-in. by 2-in. sawn hardwood spaced 18-in. centre to centre, checked into top plates and well spiked.

Rails to be 4-in. round hardwood, or 4-in. by 2-in. sawn hardwood if preferred, to be 3 in number on each side, checked into and spiked to posts.

Provide and fix 4-in. joists under floor, embedded in the ground, about 18-in. centres for nailing iron flooring to.

Provide also a round hardwood rail to protect galvanised spouting for collecting liquid from floor.

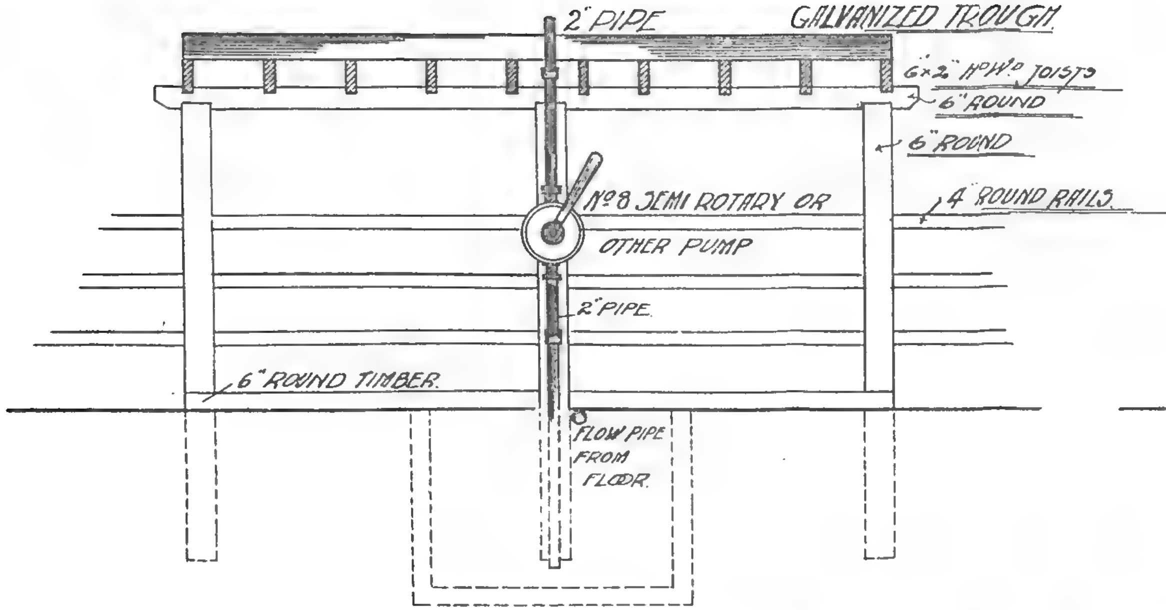
Frame the gates as shown with 3-in. by 1-in. hardwood double heads and heels and 3-in. bars and braces all bolted together and hung with light hooks and bands, and fitted with strong bar bolts as directed.

Build the yard fences as shown, or as required by the proprietor.

Provide 22-gauge galvanised-iron tray as shown on top, turned up 6 in. at sides and ends, finished with a strong bead at top edge perforated with No. 10 gauge holes every 3 in. apart at bottom, to be made in two or three sections as required and bolted together at joints with a piece of felting between; screw same to floor joists as directed.

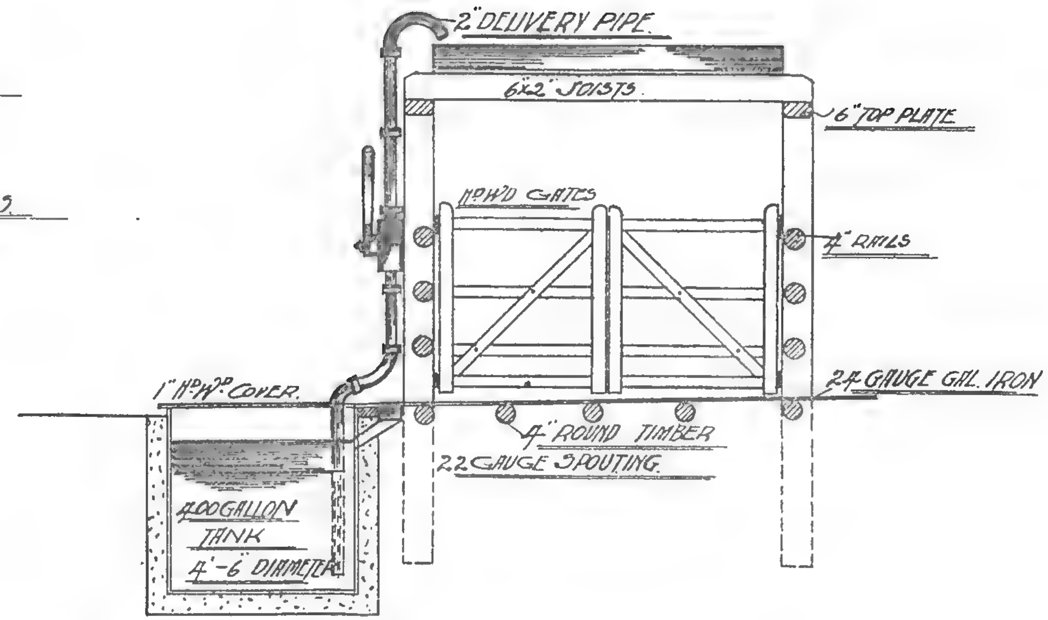
Lay the floor with 22-gauge galvanised corrugated iron with a fall of 2 in. from the high side, to have 1½ corrugation lap, with felt in between, and fix to same a 4-in. by 3-in. 22-gauge galvanised iron spouting with a 2-in. waste pipe from same; provide all stop ends, &c., necessary.

Provide and fix a No. 8 Semi-Rotary pump or other approved force and lift pump, with 2-in. suction and delivery pipes with a back-flow valve on bottom of suction pipe; provide all bends, sockets, and fittings necessary.

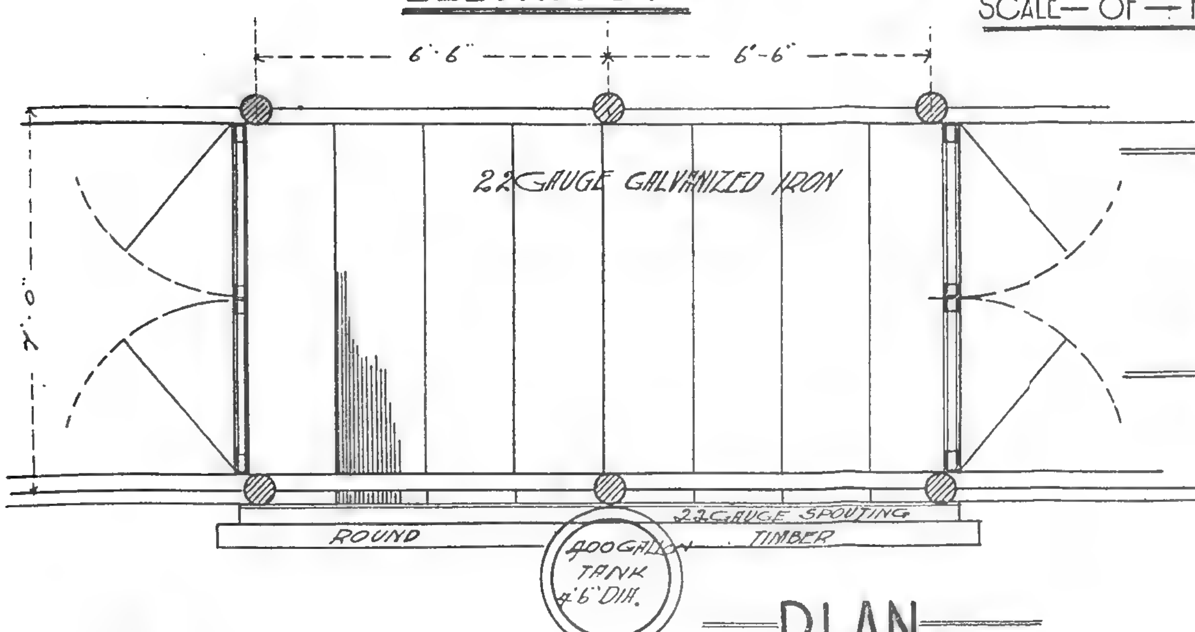


ELEVATION

SCALE— OF — FEET



SECTION



PLAN

PLAN OF SHEEP SPRAY
FOR
TREATING 250 SHEEP
PER
HOUR

F. H.
10th Dec. 1914.

ARTHUR MORRY
SURVEYOR
18th Dec. 1914.

Provide and fix in position shown a 400-gallon corrugated galvanised-iron tank let into the ground and encased in 4 in. of concrete. Provide a 1-in. hardwood cover for same, with strong ledges.

A 400-gallon ship's tank may be substituted for the above if preferred, when no cover will be required.

Leave all satisfactory at completion.

Double the number of sheep may be sprayed by simply doubling the length, and adding another pump.

THE SHEEP BLOW-FLY.

By A. H. CORY, M.R.C.V.S., Deputy Chief Inspector of Stock.

SOME RESULTS OF DIPPING EXPERIMENTS.

One of the experiments initiated by the Department of Agriculture and Stock at Gindie State Farm has reached a stage when some of its results may be indicated.

One fact has to be borne in mind, and that is—the season since April last to June has been exceedingly dry, and, in consequence, flies did not put in an appearance until later, either at Gindie State Farm or the district generally. It will be necessary, therefore, that this particular experiment be repeated in the coming year.

The experiments are designed to test the question whether dipping is beneficial in regard to the prevention of losses in sheep by blow-flies. To that end 645 sheep were purchased by the Department in April last.

These sheep were all ewes which had not been joined with the rams, were aged from 18 months to 3 years, and had about two months' wool on their backs at the time of purchase.

A shower dip on the Tandawanna principle was erected, and the sheep thoroughly saturated with the various makes of dip (ten in number) which were offered.

The sheep were drenched for worms on the 15th of April, and on the 17th of that month were dipped. Fifty animals were treated with each dip, and 145 were kept as controls—*i.e.*, not treated at all. That is, there were 500 dipped sheep and 145 untreated.

There were present at the operations Mr. W. G. Brown (State Sheep and Wool Expert) and Mr. Robert Jarrott (then manager of Gindie State Farm) and myself. After being dipped, rams were put with the ewes and left with them for seven weeks, the whole flock being watched daily by Mr. Jarrott or his assistants, and inspected thoroughly, weekly, by Mr. W. G. Brown. No flies were seen until rain fell in June (344 points), and then in only a few cases which quickly recovered, the flies dying off.

On 27th August the Acting Manager (Mr. E. Batts) reported that flies were beginning to work amongst the experimental sheep; and from the 1st September until 16th October the sheep were closely inspected once a week by Mr. Brown, besides being closely watched by Mr. Batts.

There was a fall of 432 points of rain on 8th, 9th, and 10th October; and, therefore, a big proportion of the sheep were seen to be blown.

Fearing that big losses would take place, and seeing that there was then about eight months' fleece on the sheep, Mr. Brown decided to crutch the sheep. On the 16th October, therefore, the sheep were crutched, and every sheep carefully examined, marks recorded, and the condition of each animal carefully noted. This latter in the case of blown sheep was recorded "badly blown, slightly blown, freshly blown on old infestation, and not blown at all in respective cases." The table containing the analysis of each lot of sheep will be seen below.

There were several deaths—5 to be exact—and these died during the six months from causes unconnected with flies; 9 were missing through breaking into neighbouring paddocks, leaving a balance of 631 sheep examined, whose condition was recorded.

It was found on inspection that the main attack of flies came after the 8th of October; and it is noteworthy that the flies attacked the sheep during the period when lambs were falling or about to fall.

The results so far as shown by the figures are:—

A total of 631 were examined.

A total of 167 were more or less seriously blown = 26·44 per cent.

A total of 92 were blown in 491 dipped sheep = 18·73 per cent.

A total of 75 were blown in 140 undipped sheep = 53·67 per cent. On these figures, therefore, it seems as if dipping the sheep gives a certain amount of protection. True, the sheep do not escape being blown, but inspection of the blown animals shows that the undipped sheep suffer in a far greater measure than those dipped.

One other fact seems to have emerged, and that is—it was only when the ewes began to lamb that the flies began to work seriously. The sheep will be shorn in January, and another test made in the same manner as the first one. If the results approximate to those of this first experiment, then another palliative will positively be added to what we know.

When the sheep are shorn in January, close attention will be paid to the results on the wool of the various lots of sheep treated by the dips used, as up to the present time there is some conflict of opinion in regard to the relative values of the dips used.

Name of Dip.	Number Dipped.	Total Number Blown.	Number on Back and Ear.	Marking on Body of Sheep.	Infested after 1st September.	Infested since 8th October.	Infested, but wholly Dried Out.	Infested, Dried Up, and Re-infested.	Badly Infested.	Rainfall since Dipping.	Remarks.
A	50	12	1	Red ring on back ..	None	5	6	1	1	June — 344 points	Recently blown sheep were in nearly every instance blown at root of tail, or the udder.
B	50	6	2	Red ring off rump ..	1	5	None	None	None		
C	50	11	3	Red ring back of head	None	4	3	None	4		
D	50	9	4	red ring near rump	5	6	None	4	3	..	"Badly infested" means that the whole breach is involved.
E	50	9	5	red ring forehead ..	None	9	None	None	4	October 8, 9, and 10—432 points	
F	50	11	6	Red ring top of shoulder	2	10	1	None	1	..	The undipped sheep show very much more extended areas of damage than the dipped sheep.
Ga	50	81	7	Red stroke along back	1	8	1	2	3		
Gb	50	8	81	Stroke between ears	1	8	None	2	None		
Ha	50	8	9	Red ring top of rump	2	8	None	4	None		
Hb	50	8	10	Bar across back ..	3	6	None	7	4		
Controls undipped ..	145	75	End of book	No mark ..	42	70	3	9	34		

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF NOVEMBER, 1914.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Miss Edition	Jersey	10 July, 1914	732	5·0	43·18	
Nellie ...	Shorthorn... ...	20 July ,,	992	3·6	41·76	
Glen ...	,, ...	26 Oct. ,,	841	4·2	41·45	
Madam Melba	Holstein	8 Sept. ,,	1,076	3·2	40·17	
Lark ...	Ayrshire	27 July ,,	802	4·0	37·61	
Honeycombe	Shorthorn... ...	23 Sept. ,,	870	3·6	36·63	
Rosebud ...	Ayrshire	20 Sept. ,,	960	3·2	35·80	
Bluebelle ...	Jersey	27 May ,,	612	4·6	33·17	
Miss Lark ...	Ayrshire	31 Oct. ,,	669	3·8	29·77	
Countess of Brunswick	Shorthorn... ...	26 July ,,	642	3·9	29·33	
Lady Spec ...	Ayrshire	24 Oct. ,,	641	3·9	29·28	
Pauline ...	Shorthorn ...	12 Oct. ,,	732	3·4	29·05	
Lady Lil ...	Jersey	22 Aug. ,,	467	5·2	28·67	
Silver Nell...	Shorthorn ...	5 Oct. ,,	680	3·6	28·63	
Sweet Meadows	Jersey	28 July ,,	478	5·0	28·20	
La Hurette Hope	,, ...	No records ...	451	5·2	27·69	
Lady Melba	Holstein	6 Mar., 1914	694	3·4	27·54	
Burton's Lady	Shorthorn ...	23 July ,,	638	3·5	26·08	
Miss Bell ...	Jersey	13 Aug. ,,	449	3·5	25·18	
Lady Margaret	Ayrshire	19 June ,,	609	3·5	24·90	
Auntie ...	,, ...	26 June ,,	554	3·8	24·64	
Lady Dorset	,, ...	20 Sept. ,,	594	3·5	24·29	
Lady Athol	Shorthorn... ...	10 July ,,	555	3·8	23·36	
Davidina ...	Ayrshire	17 July ,,	597	3·2	22·27	
Lowla II. ..	Shorth'rn-Ayrshire	23 Sept. ,,	613	3·0	22·43	
Cocoatina ...	Jersey	20 April ,,	370	5·0	21·83	
Lucinda ...	Ayrshire	20 Sept. ,,	602	3·1	21·73	
Gretchen ...	Holstein	6 May ,,	529	3·4	21·00	
Rosine ...	Ayrshire	29 Sept. ,,	489	3·6	20·58	

THE COMMONWEALTH STANDARD JERSEY HERD BOOK.

We are indebted to Mr. Alfred Gorrie (editor and publisher of a very valuable publication under the above title) for the first volume of a work which has occupied two years—years devoted to the inspection of animals and verifying pedigrees. Mr. Gorrie, who is well known in Queensland, has been for twenty-three years constantly associated with Jersey cattle, and during that time has collected and indexed particulars of pedigrees and performances of a very large number of Jersey cattle. His object has been to produce a herd book of this breed with a standard of admission so fixed as to exclude animals graded from the common herd. The necessity for such a book has long been felt, and the Commonwealth Standard Jersey Herd Book appears to supply that need as a reliable index to Jersey cattle in Australia of absolute and undoubted purity.

Many breeders of Jerseys take a pride in developing herds from pure foundations—others do not. The latter keep one or two pure animals and a large number which they have graded up from the common herd, and from these they rear as many bulls and heifers as it is possible for them to find buyers for; and they thus depend for their profits on the sales of stock instead of from the production of milk and butter from their herds.

The registration in Australian herd books of animals without pedigree and others bred from the common herd has had a most damaging effect on the Jersey breed. Most dairymen know that it is a very retrograde practice to use a grade bull; but many such are in use at present, because buyers have been led to believe that animals registered in herd books are pure, and, not being able to investigate the pedigrees of their purchases, have ruined their herds by the introduction of impure animals.

The Commonwealth Standard Jersey Herd Book is not only a reliable and faithful index of purebred Jersey cattle in Australia, but as a genealogical book of reference is probably the most complete herd book in the world. Pedigrees are fully tabulated back to the sixth generation, and all animals have been inspected and approved of by the editor, so that each animal registered is not only of pure descent but of choice individuality as well. The performances of animals as well as those of their ancestors have been investigated and are published with their pedigrees. These performances, indicating as they do the dairy prepotency of certain strains, will help dairymen considerably in the selection of stud animals. The data contained in the book concerning almost every good Jersey animal in Australia is such as gives it a rare value to Jersey cattle-breeders and all others who are taking up dairying as a means of livelihood and are determined to get the highest financial result which the Jersey breed returns.

As an illustration of the class of animal registered in the Commonwealth Standard Jersey Herd Book and the capacity of the pure Jersey cow for butter production, the test of Mr. Samuel Hordern's "Leda's Snowdrop" is valuable. She was tested by the New South Government for twelve months, during which time her official returns show that she produced 11,886 lb. of milk and 796½ lb. of butter. Her age at the commencement of the test was 10½ years. Such a return shows how splendidly adapted the purebred Jersey cow is for heavy and continuous milk and butter production, and should encourage all dairymen to secure absolutely pure animals of the producing strain, and thus place themselves in positions favourable for developing animals of the producing qualities of "Leda's Snowdrop."

The Commonwealth Standard Jersey Herd Book can be obtained from the publisher; price, £1 1s. per volume. The herd book under notice is well got up, well printed, and profusely illustrated, and contains entries of absolutely purebred Jersey cattle approved as typical animals, whose pedigrees trace in unbroken lines to foundations bred in Jersey herds recognised as pure prior to 1888.

The Horse.

HOW TO TREAT A FISTULA.

When a fistula on withers is forming, it is customary to apply a blister or hot fomentations. This on rare occasions appears to effect a cure, but in the majority of cases it hastens the swelling and brings it to a head. After it has broken, surgical treatment is required.

The next thing is to find out the direction and depth of the fistula. This is done by using a flexible probe, some 8 or 9 in. in length. Free drainage must now be given by opening along the full length of the probe, or, if thought advisable, an opening can be made at the lower part of probe, and a seton of tape or other material passed through and tied on the outside. A seton keeps the wound open and assists in draining the cavity, but the first method of opening up is generally found more satisfactory. Both sides of the withers should be opened, if necessary, and any necrosed (dead) tissue removed. The top of withers should not be opened crossways (from side to side), because there is a ligament which runs along the middle line of shoulders from the head—if cut, causes serious consequences.

The chief points to remember are:—Free drainage, the removal of all dead tissue, and the prevention of pockets where pus can accumulate.

The following lotion should be used every third day on the fistula after it has been opened up, until four applications have been applied:—

Corrosive sublimate	½ oz.
Methylated spirit	1 pint.

This is best applied by soaking some cotton wool or other absorbent material with the lotion, then packing the saturated cotton wool in the fistula. This treatment can be repeated, if necessary, after 10 or 14 days' interval. Knives, probes, &c., should be thoroughly disinfected before using by placing them in boiling water or some disinfectant such as carbolic acid, Condy's fluid, &c. Knives and other steel instruments should not be allowed to come in contact with the corrosive sublimate solution.

SHRINKAGE OF WOOL WEIGHTS IN STORE.

By an oversight, we omitted to state that the article on shrinkage of wool, published in the December issue of the Journal (1914), was supplied by Mr. W. G. Brown, Sheep and Wool Expert of the Department of Agriculture and Stock.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER, 1914.

During the month 5,748 eggs were laid. Broodies have been very numerous. The weather, too, has been trying, a temperature of 107·5 degrees having been recorded on the 26th. Mr. Murchie lost a bird on the above date through heat appoplexy, but we managed to save the others by throwing water on the houses. Green food being now scarce, we shall have to commence to use lucerne chaff as a substitute. Loloma Poultry Farm's White Leghorns win the monthly prize with 169 eggs. The following are the individual records:—

Competitors.	Breed.	Nov.	Total.
A. T. Coomber	White Leghorns ...	154	1,045
T. Fanning	Do.	145	1,041
Loloma Poultry Farm, N.S.W.	Do.	169	995
Moritz Bros., S.A.	Do.	163	992
Kelvin Poultry Farm	Do.	123	965
Loloma Poultry Farm, N.S.W.	Rhode Island Reds ...	130	950
Geo. Tomlinson	White Leghorns ...	150	948
Cowan Bros., N.S.W.	Do.	150	938
R. Burns	Black Orpingtons (No. 1)	132	933
A. F. Camkin, N.S.W.	White Leghorns ...	158	909
E. Le Breton	Do.	137	902
A. H. Padman, S.A.	Do.	159	902
J. T. Coates	Black Orpingtons ...	129	897
Mrs. Munro	White Leghorns ...	165	893
R. Burns	S. L. Wyandottes ...	129	892
Mrs. Bieber	Brown Leghorns ...	148	890
T. Fanning	Black Orpingtons ...	157	884
J. R. Wilson	White Leghorns ...	145	884
Marville Poultry Farm, Victoria ...	Do.	161	884
R. Burns	Black Orpingtons (No. 2)	141	884
J. Franklin	White Leghorns ...	153	871
Derrylin Poultry Farm	Do.	150	868
J. T. Coates	Do.	147	861
F. McCauley	Do.	149	856
E. V. Bennett, S.A.	Do.	134	854
G. E. Austin	Do.	139	850
J. Gosley	Do.	136	852
R. Jobling, N.S.W.	Do.	136	854
J. Manson	Do. (No. 1)	141	840
J. Kilroe	Do. (No. 2)	151	832
J. D. Nicholson, N.S.W.	Do.	121	820
Range Poultry Farm	Do.	140	810
Mrs. Bradburne, N.S.W.	Do.	139	810
D. Moreton, N.S.W.	Do.	140	807
J. Zahl	Do.	147	801
J. Kilroe	Do. (No. 1)	125	789
C. M. Jones	Do.	147	787
J. N. Waugh, N.S.W.	Do.	133	767
J. Murchie	Brown Leghorns ...	140	753
J. M. Manson	White Leghorns (No. 2)	135	742
Totals	...	5,748	35,053

Owing to the transposition of two figures, an error was made in last month's grand total; it should be 29,304 instead of 23,904.

The Orchard.

DIE-BACK OF CITRUS TREES IN THE NORTHERN DISTRICTS.

By G. WILLIAMS, F.R.H.S., Cairns.

The characteristics of the above malady are, unfortunately, but too well known, and, with allied more or less obscure affections, have caused serious losses in citrus orchards. Investigations in respect of origin and remedial treatments suggested have not shown any appreciable results. From what has been published it would appear that principal attention had been given to affected trees, and but little bestowed upon those in infested districts as were almost or entirely free from external indications. From the latter, comparisons may be made and the effects of immediate environment with the influences exercised in the prevention of or in minimising the effect of disease. The establishment in diseased trees being effected before external indications are manifested, prevention will be preferable to subsequent treatment. Sprays of different formulas have been recommended from various sources; but, as the malady shows no sign of abatement, either the formulas are ineffective or indifferently applied, and better results will undoubtedly follow future plantings by avoidance of known favourable agencies for its progress. Amongst these are:—Primarily, soil of a heavy nature; a close, retentive, or impervious subsoil, giving rise to the effect of extremes of dry and moist conditions (an undue percentage of "clay" exercises similar influence) with insufficient drainage, lack of cultivation, over-manuring, excessive irrigation, and also working on unsuitable stock. Drainage is a most important feature, citrus being very deep rooted, and no artificial system is applicable to remedy a natural deficiency. In its absence an even state of moisture cannot be maintained. Where different classes of soil, particularly those of a widely different nature, are included in one orchard, and it is noted that trees planted in one class are healthy and vigorous, whilst in another they are badly attacked, the suggestion arises that to the unsuitability of such soil is almost, if not entirely, attributable the cause of the trouble. Wider observations and comparisons afford the fullest confirmation. Trees planted in light loam of good depth remain immune, and, even when cultivation is neglected, show but very slight indication of attack; but where a dense constituency prevails some of the known features favourable to the disease are an invariable accompaniment. Its presence is eventually manifested in a varying extent—even to killing the trees outright. In consideration of suitable soils, examination must go much below the surface. On alluvial flats with a surface of loose sandy soil, a subsoil of heavy nature is not infrequently met with, and in such situations trees flourish but for a limited time. The trees being evergreen and almost constantly active, sustaining uninterrupted evaporation from their leaf surfaces, they must always be provided with moisture or disease will result to tree or fruit. Without

excessive rainfall, the requisite supply of moisture can be retained in a suitable soil by cultivation; but where an unbroken surface, or grass or other weeds are permitted, a corresponding depression exists. The theory of maintaining moisture by surface cultivation has been frequently explained. Exact determination of moisture present during a dry month, at depths of the soil from 1 ft. to 6 ft., shows a gain of almost 50 per cent. where cultivation prevails. Moreover, in cultivated land the water in lower soil is held for the use of roots, and as fast as absorbed by them the supply is replaced through the firm soil below, which, evaporation being stopped, remains moist and permeable by the roots. In planting worked trees the influence of stock, though a most important one, is seldom considered. Experience further confirms the observations of Mr. H. Tryon—that oranges worked on rough lemon stock are the most susceptible to attack. The liability of the Lisbon lemon so worked is much more pronounced. Seedling trees have been quoted as comparatively immune, but this is erroneous. Young trees, both orange and mandarin, where planted in retentive scrub soil, are found to be very seriously affected at two and three years old. Planting trees in holes below the level of surrounding surface, or so that they will sink below that level, is very detrimental. The essentials to maintaining the trees healthy are:—A suitable soil of sufficient depth and drainage, with an even supply of moisture (mainly attainable by systematic cultivation) and reasonable attention in all details. Choice of varieties may have some influence according to vigour and constitution of the subject.

State Farms.

KAMERUNGA STATE NURSERY.

MANAGER'S REPORT FOR OCTOBER, 1914.

Rainfall for the month, 371 points.

Number of days on which rain fell, 16.

Weather during the last week has been hot and steamy.

Coffee is now bearing its second crop of flowers, and all the young trees look well, the foliage being a rich dark green; and, owing to the moist conditions, it is hard to distinguish between the manured and unmanured trees. The ground should be kept clean, and, where possible, mulch round the trees.

Vanilla.—The weather has been most favourable for the growth of vines. Those two years old are flowering freely, and the pods are setting well. All flowers are being pollinated. Thinning out of pods will be done later.

Gingers, turmeric, arrowroots, and yams should be planted now.

Animal Pathology.

CAN THE CATTLE TICK BE EXTERMINATED IN QUEENSLAND?

BY P. R. GORDON.

After a careful study of Mr. Pound's report on what has been accomplished in the way of exterminating the cattle tick in some of the American States, it has occurred to me that my extenisve practical experience in the successful extirpation of the sheep scap Acarus in Australia may supply some useful hints in an endeavour to carry out a similar work in respect to the cattle tick. I should premise that, up to 1866, New South Wales and South Australia were the only two colonies of the Australasian group that had effectually banished scab from their flocks. Victoria and Tasmania were not free from the disease until well on in the eighties, and New Zealand not until 1892. In the early fifties New South Wales stamped out the disease by the slaughter of all infected and contact sheep, compensating the owners from a fund formed by a levy on all sheep within that colony, and the flocks remained free from the disease until 1863, when some scabbed sheep on vessels trading between Melbourne and Newcastle had accumulated in a butcher's paddock at the latter port, and were sold to a dealer, who travelled them north towards the Queensland border, infecting all the flocks along their route; and, as South Australia had, a year or two prior to that date, cleared her pastures of the disease without the slaughter of the diseased sheep, the New South Wales Government hurriedly passed an Act similar to that in force in South Australia, appointed the late Mr. Alexander Bruce to be Chief Inspector under the Act, and I was appointed as his deputy—to act at headquarters during his tours of inspection, and to carry out country inspections when his presence was necessitated in the capital. The Act came into operation on 1st January, 1864, and the disease was completely exterminated in eighteen months, and the colony proclaimed clean in 1866. This feat was brought about solely and entirely by the Act having been administered by Mr. Bruce by a determined insistence on all its provisions being carried out in their integrity, the money penalties for laxity or neglect having been heavier than those under any other Act, the Customs Act alone excepted. There were several specifics reported to have been effective in killing the scab Acari; but the greatest difficulty hitherto had been to find one that would effectually kill the Acari, and at the same time act as a preventive of reinfection. The tobacco and sulphur dip—first brought into notice by Mr. John Rutherford, Victoria—was found to be the most reliable (up to that

date, at least), and was adopted as the Government dip; the use of all other specifics having been strictly prohibited. On the preventive measures depended the whole success of the treatment, as will be the case with the cattle tick. As already stated, the tobacco infusion was found most reliable in the destruction of the scab insect, but the sheep were liable to reinfection from trees, fencing posts, yards, &c., against which sheep had rubbed, so that the flowers of sulphur mixed with the tobacco infusion, and which was kept continually stirred up in the bath, so peppered the fleeces as to prevent reinfection for a period of six months, by which time all Acari on trees, fences, &c., had died off. But two dippings within an interval of from fourteen to twenty days were found to be necessary, because a study of the life history of the Acarus showed that when introduced on a sheep it, at once, burrowed under the exterior cuticle, reappearing in thirteen days with its numerous progeny attached to its legs, the lymph exuded causing pustules, which, breaking, formed scabs—whence its popular name, so that at the time of first dipping it almost invariably happened that many Acari were in a partial state of development under the surface of the skin, and could not be reached by the medicaments. Mr. Bruce resisted all applications of owners and agents of proprietary dips—and many such were made to the Government—to even submit their specific to a test for the reason not alone that the tobacco and sulphur dip, which was prepared under the surveillance of officers of the Department, but also because in the case of proprietary dips—many of which had failed to be effective—the ingredients of which they were composed were not made public; and the wisdom of this will be made plain by a circumstance that occurred some eighteen years later on. Now, in any attempt to stamp out the cattle tick in Queensland a means of preventing reinfestment for a certain time, to be ascertained, must, as with sheep scab, be of the very first importance. In America they have a natural means to that end in their meteorological conditions which are absent in Queensland, and, therefore, it will be necessary, as was our case with sheep scab, to set up an artificial means of prevention; and even if such is discovered, I strongly question whether extermination can be attained until all large grazing holdings have been subdivided into smaller properties and all cattle compulsorily kept within fences. From my experiences of sheep scab as related above, I would strongly recommend that the use of all proprietary dips for cattle tick be prohibited, and only the Government dip be allowed, unless the component parts of those dips be fully described to the Department's Analyst. My experience while in office of many of these proprietary dips was that most of them at least were merely the Departmental dip, with the addition of some ingredients which had no effect beyond increasing the cost of the dip. The extermination of the

ticks should be the one and only aim, and not to be side-tracked by any other consideration. I am, of course, aware that since the time when sheep scab was exterminated several effective sheep dips have been placed on the market; but, in strong support of Mr. Bruce's action in prohibiting the use of proprietary dips at the time, the following well-known circumstance occurred in 1884 or 1885:—It may be in the recollections of many sheepowners that about that date some sheep imported from America, which had passed through the Sydney quarantine and duly disinfected under the then Government Veterinary Surgeon (the late Mr. Willows) were sold to a well-known pastoralist, then of New South Wales, now of Queensland, and taken to his run, where soon afterwards they developed scab and were destroyed by order of the Government. The cost of destruction, the cleansing of the run, compensation to the owner, and legal expenses involved the Government in an outlay of over £80,000. The veterinary surgeon was dismissed the service. Mr. Bruce was suspended, and only reinstated on account of the many and valuable services to the pastoral industry that had been carried out on his initiative; and the dip the veterinary had used with the sheep, although then and still a valuable disinfecting fluid, and advertised as an efficient sheep dip, had "but scotched the snake, not killed it."

THE NATIVE TAMARIND.

Mr. F. Claussen, head teacher of the Brookfield State School, brought to this office a sample of a native fruit, locally known as the Native Tamarind (*Diploglottis Cunninghamii*). We submitted the fruit to Mr. C. Ross, Instructor in Fruit Culture, and he has furnished the following notes on it:—

"The fruits submitted are what are called 'The Native Tamarind'; botanically, *Diploglottis Cunninghamii*. I have seen the tree growing in the coastal scrubs and mountains further inland from North to South of Queensland. In some situations it grows to a fairly large tree. The young shoots, panicles, and leaf stalks are covered with soft, brownish hairs. The shape and size of the leaves vary on the same tree, ranging from 6 in. to over 12 in. in length. The fruit is borne in panicles, each fruit being enclosed in a round casing within which is a seed surrounded by an amber-coloured, juicy pulp of a brisk, pleasant, acid flavour. It is a useful dessert fruit, and excellent for conserves and jam."

Vegetable Pathology.

ONION WHITE BLAST.

By H. TRYON, Government Entomologist and Vegetable Pathologist.

The so-called blight affecting the onion crop in the Memerambi district, illustrated by the specimens transmitted, is a special injury due to the attacks of a small pale green, elongated insect belonging to the family Thysanoptera (fringe wing flies) whose members are spoken of as "Thrips."

This depredator concerned occurs in very large numbers at the bases of the leaves ensconced in the narrow interstices that exists between one and another.

The particular species of Thrips concerned cannot be as yet ascertained, since none of the winged adults occur in the sending, although the larval ones still attached to it are quite numerous. However, its identification is important, as this will throw light on the range of its food habits, and so possibly indicate sources whence it may have emanated, and to which, therefore, attention might be profitably given when devising repressive measures.

The injury is occasioned by the exercise of the biting habit of the Thrips, each bite originating a small gray spot and these spots becoming so numerous that the foliage, after first discharging its green colour, dies and becomes brown. Obviously, the oldest parts manifest the more severe injuries; thus the first-formed leaves succumb prior to the others, and the tips of the leaves die first, parts more and more back successively being implicated in the destructive damage.

Originally the insect is borne to the subsequently affected plant through the air on the wing, and so it becomes dispersed. Again, possibly, other truck plants might serve to originate the trouble, since many species of Thrips are general feeders.

A few insects, if overlooked, may soon, in the course of natural increase, give rise to a numerous host. The entire life from the egg upwards may be spent on the plant once adopted for a residence and feeding ground.

Once one sees the small whitish specks on the foliage of the onion, one may suspect the presence of Thrips, and, if it be present, the act of tearing the foliage apart will reveal the minute green elongated insects.

This "White Blast," as the disease may be designated, is evidently far worse than it would otherwise be owing to the prevalent drought; for dry conditions, whilst unfavourable to the onion plant, are conducive to the rapid multiplication of the onion Thrips, its enemy.

REMEDIES.

In dealing with the onion Thrips it must be remembered we have before us a very delicate hostplant. Therefore, the remedies that are most suitable for coping with insects of the class when occurring on fruit trees are not admissible in its case.

There are grounds, however, for concluding that even a slightly potent contact-insecticide will destroy it—for example, some application in which tobacco forms an essential ingredient; especially a soap containing nicotine.

Should the farmer have any tobacco growing (and everyone should have a little of this useful insecticide) he should roughly cure it, make a tea or decoction of it (1 lb. of tobacco in 2 gallons diluted to 4 gallons), and use this as a spray, adding a little soap or molasses to promote adhesion; or he might employ tobacco extract, and use this diluted.

Tobacco extract sometimes contains 40 per cent. of nicotine, and when of this strength should be blended with water in the proportion of 1 pint in 1,800. There is another form in which nicotine containing 60 per cent. may be used. Formerly a tobacco extract named "Rose Leaf," having a definite value in nicotine, was obtainable here. This, mixed with water in the proportion of 1 in 24, should be a very efficacious destroyer of the Onion Thrips.

The tobacco dust, if obtainable, is another form in which this nicotine-containing body may be used. It should be placed in a tin having its mouth covered with closely woven iron gauze, and simply dusted well into the hearts of the plants, care being taken lest the powder gets wet. Even at this late date, however, it appears that some good might attend its application.

I have dwelt upon the use of tobacco, since, especially when used as a basis in any spray wash, it will prove serviceable; but ones containing white oil soap and kerosene emulsion, too, might have been advocated. But both are liable to do injury, especially if not well made or applied when the light is strong.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND AND BRITISH NEW GUINEA.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order RUTACEÆ.

ATALANTIA, Corr.

A. glauca, *Hook. f.* var. **inermis,** *Bail. n. var.*

Dr. Lindley, the first botanist to describe the species, speaks of the plant as spinous (Mitch. Trop. Austr., p. 353). Bentham in the "Flora Australiensis," 1, p. 370, however, speaks of the plant as "often armed with straight or recurved spines," and subsequent writers have united the spinous and spineless varieties, but I have received specimens of the latter from the above two localities and consider it advisable to attach to the latter a distinctive name.

Hab.: Near Dalby, *Dr. T. L. Bancroft* (September, 1913); Chinchilla, *R. C. Beasley* (December, 1914).

Order RUBIACEÆ.

GALIUM, Linn.

G. tricorne, *With.* Annual, glabrous, stems simple or slightly branched at the base, ascending, very scabrous. Leaves 6-8-verticillate, lanceolate-linear, mucronate, scabrous. Peduncles shorter than the leaves with 1, 2, or 3 flowers, the pedicels of which are rolled back and thickened after flowering. Fruit covered with small tubercles.

Hab.: A native of Europe. I have recently received specimens naturalised near Brisbane from *Mr. Jas. Keys.*

Order PRIMULACEÆ.

ANAGALLIS, Linn.

A. parviflora, *Hoffm.*, gg, and *Link.* Very similar to the common Pimpernel (*A. arvensis*). Annual, glabrous, slightly branched, stems ascending. Leaves opposite, sub-rotund, enlarged and embrassing the stem at the base, obscurely nerved. Flowers blue or pink on peduncles 2-3 times longer than the leaves. Calyx lobes lanceolate acuminate; corolla small, equalling or slightly exceeding the calyx, lobes oval. Capsule globose, not exceeding the calyx.

Hab.: A native of the Mediterranean region, naturalised near Brisbane, *Colonel C. F. Plant.*

Order SCROPHULARINEÆ.

HERPESTIS, Gaertn. f.

H. chamædryoides, *Kunth.* (Plate 1.) A procumbent branching glabrous herb. Branches slender, diffuse, tetragonous, often rooting. Leaves opposite, shortly petiolate, ovate or obovate-oblong, obtuse, crenate, base cuneate, entire, 3-9 lines long, 2-6 lines broad. Pedicels

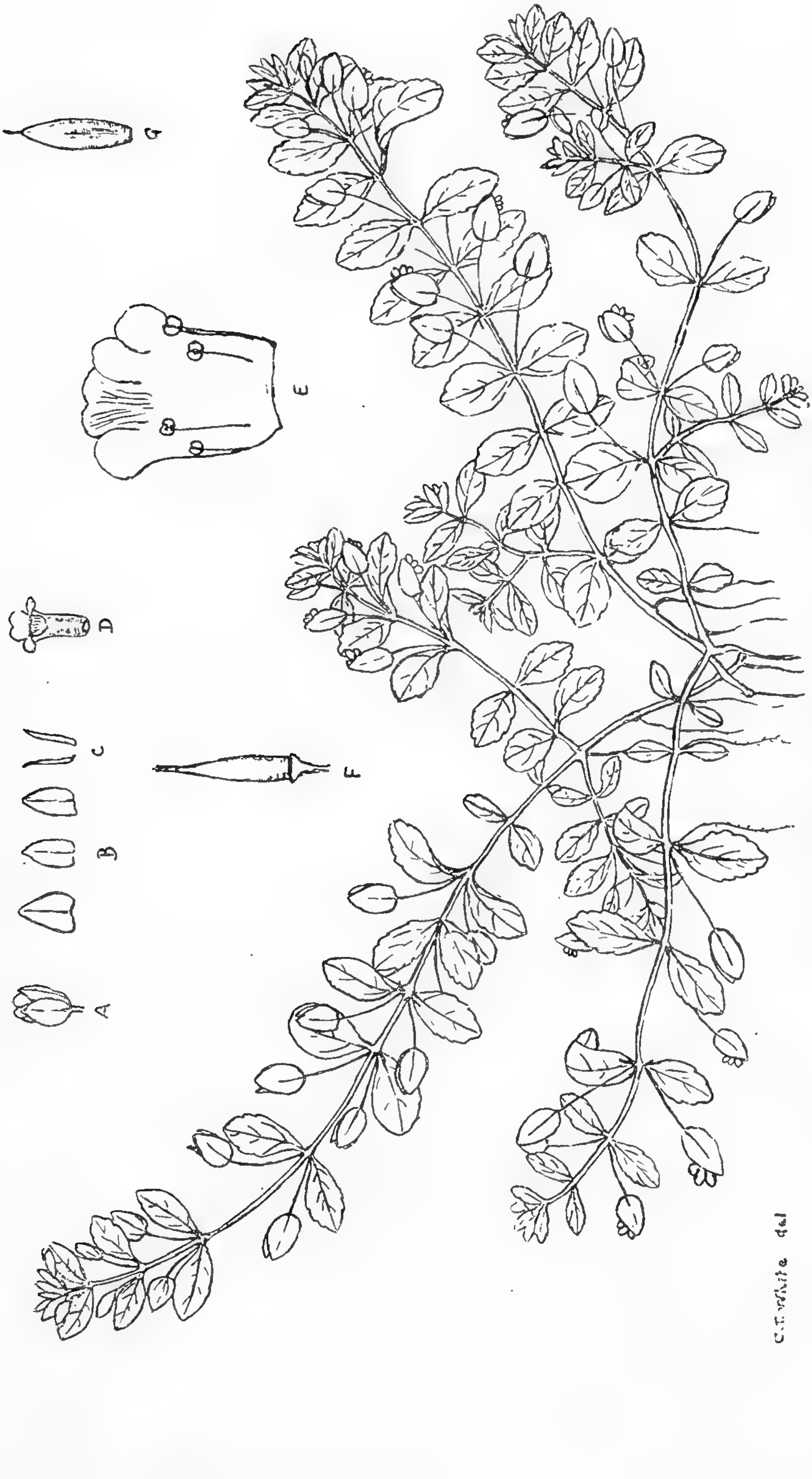


PLATE I.—HERPESTIS CHAMÆDRYOIDES, *Kunth.*

A—Flower. B—Outer calyx lobes. C—Inner calyx lobes. D—Corolla. E—Corolla laid open. F—Pistil. G—Fruit.

A D—Natural size. E G—Enlarged.

axillary, solitary, often opposite, erecto-patent, filiform, ebracteate. Calyx 5-partite, 3 outer segments ovate oblong, the 2 inner ones linear lanceolate. 3-5 lines long. Corolla yellow, very slightly longer than the calyx, upper lip emarginate, lower trifid. Stamens short, included. Style short. Capsule, ovate, acute. Seeds numerous, very minute.

Hab.: A native of Tropical America. Specimens have been received as naturalised near Cairns from *Mr. C. E. Wood.*

This plant is met with as a naturalised weed in the ricefields of Java; it is also said to be a not uncommon weed in the West Indian canefields.

Order PLANTAGINEÆ.

PLANTAGO, Linn.

P. major, *Linn.* var. **Cornuti,** *Gouan.* (as a species). This differs from the common form in its much larger size. A perennial one to over 2 ft. high. Leaves oval or elliptic, 7-9 nerved, attenuated at the base into a very long petiole. Scapes much longer than the leaves.

Hab.: A native of the Mediterranean region; now a naturalised weed on some of the farms in the Pine River district. Specimens received from *E. W. Bick.*

Order URTICACEÆ.

FICUS, Linn.

F. scandens, *Roxb.* I have just recently received specimens of this from Samarai, British New Guinea, from Mr. Thos. J. A. Thomson, who states: "I have seen two remarkable cures of big sores on boys' feet with this after trying all our medicines; the natives simply break the fruit off, then drop on the sore the white milk that exudes from the fruit." The specimens forwarded seem to agree better with the normal form than with the Australian variety.

Order FUNGI.

Boletus portentosus, *Berk. et Br.*

Hab.: At the base of a tree, Goodna, *C. T. White.*

Ustilago utriculosa, *Tul.*

Hab.: On inflorescence of *Polygonoum attenuatum,* Ithaca Creek, *C. T. White.*

A MARKET FOR MAIDEN-HAIR FRONDS.

The Colonial Botanist has recently received the following letter from Messrs. Gordon and Gotch, 15 St. Bride street, London, E.C., England:—

"Dear Sir,—A friend of ours is of the opinion that there should be an opening for considerable business in the shipment of dried Maiden-hair Ferns from Australia to London.

"We have failed to secure any information on the matter over here, so venture to think that you in your official capacity may be able to assist us by passing this enquiry into likely hands. Our friends would doubtless be able to purchase in large quantities, and we would suggest for preliminary purposes that quotation be sent per 1,000 leaves made up in fifties, the quotation being for say 5,000, 10,000, and 20,000.—Yours faithfully,

"(Sgd.) GORDON AND GOTCH."

I should think that *Adiantum formosum* is the one that would prove the most suitable for the purpose; this is the common large Maiden-hair of our Southern and Northern scrubs and the quantities referred to could often soon be gathered.

Entomology.

BEETLE BORERS OF SUGAR-CANE.

BY E. JARVIS, Assistant Government Entomologist.

The following article upon "Beetle-borers of Sugar-cane from New Guinea" has been received by the General Superintendent of the Bureau of Sugar Experiment Stations:—

It is thought that the following notes may prove serviceable to those interested in the welfare of our sugar industry, and more particularly to entomologists who are endeavouring to minimise financial losses occasioned by the injurious action of various insect pests of cane.

The beetle-borers in question were found by the writer last September at Macnade in two varieties of sugar-cane:—

CRYPTORHYNCHUS Sp.

Injuries due to this weevil are somewhat similar in general appearance to those caused by our common beetle-borer (*Rhabdocnemis obscurus*), but the tunnels seldom exceed 4 in. in length, are very irregular in width, and may entirely encompass an affected internode, thus destroying most of the internal portion. The larva does not construct a cocoon, but pupates at the end of its tunnel in an egg-shaped chamber, one end of which consists of débris tightly compacted, the whole interior being neatly smoothed and rounded.

LARVA.—The larva is a light-yellow, wrinkled, soft-bodied grub about a quarter of an inch long with bright chestnut-red head, and black mandibles.

PUPA.—Pale creamy-yellow, with dark brown eyes and two reddish black-pointed spines at the extremity of the abdomen. Length, about $\frac{5}{16}$ of an inch.

ADULT.—The perfect insect is a somewhat narrow-bodied weevil, scarcely a quarter of an inch long and of a general dark yellowish-brown colour, with a small orange-yellow blotch on each side close to the legs, which is brighter in some specimens, but fades after death to dull brownish-yellow.

Freshly emerged adults are often reddish at first, but gradually darken to the normal colour upon continued exposure to light.

Like other species of the genus, this bettle cannot fly, though able to walk quickly, and has the curious habit of feigning death when alarmed. At such times it lies motionless on its side with legs bunched together in a shapeless mass, and if chancing to fall upon ploughed ground or among weeds, its extraordinary resemblance to surrounding particles of soil, &c., enable it to easily elude observation.

Cryptorhynchus weevils are noted for possessing remarkable tenacity of life, and it may be of interest to mention that I subjected this species to strong fumes of cyanide of potassium for twenty-four hours in a tightly corked bottle, and next day found the bettle alive and able to move its legs. It did not fully recover from the effects, however, and died a few days later.

RHABDOCNEMIS Sp.

This weevil might at first sight pass for an abnormally small specimen of our common beetle-borer, but is a more slender insect, and when looked at closely the thorax and base of beak appear velvety and of a dark olive-brown tint, while the wing-covers instead of being black are deep brown, more or less reddish on the basal portion. Length, scarcely ⅜ of an inch.

It was found boring cane, the damage inflicted being very similar to that caused by *R. obscurus.* No larvæ or pupæ were observed, and only one adult (a female).

NOTE.—Scientific descriptions of these beetle-borers are reserved for publication elsewhere.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1913 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Nov.	No. of Years' Records.	Nov., 1914.	Nov., 1913.		Nov.	No. of Years' Records.	Nov., 1914.	Nov., 1913.
North Coast.	In.		In.	In.	*South Coast—continued:*	In.		In.	In.
Atherton	2·01	13	0·75	1·21	Mount Larcom	...	...	0·54	2·82
Cairns	4·06	27	3·48	Nil	Nanango	2·35	27	0·48	0·48
Cardwell	4·65	27	2·17	Nil	Rockhampton	2·12	27	0·68	0·70
Cooktown	3·13	27	2·81	Nil	Woodford	2·98	27	1·52	1·03
Herberton	2·59	27	0·61	2·04	Yandina	3·50	21	1·67	1·17
Ingham	4·09	22	1·62	Nil					
Innisfail	6·98	27	4·24	Nil					
Mossman	6·12	5	5·30	0·25	*Darling Downs.*				
Townsville	1·89	30	0·13	0·01					
					Dalby	2·47	27	0·65	0·47
					Emu Vale	2·72	17	0·56	0·81
Central Coast.					Jimbour	2·47	24	0·54	Nil
					Miles	2·35	27	1·31	Nil
Ayr	1·45	27	Nil	Nil	Stanthorpe	2·75	27	2·13	0·61
Bowen	1·29	27	1·06	0·01	Toowoomba	3·06	27	0·75	0·90
Charters Towers	1·57	27	Nil	0·02	Warwick	2·61	27	1·05	0·65
Mackay	2·45	27	1·10	0·07					
Proserpine	3·47	11	1·36	0·06					
St. Lawrence	2·12	27	0·27	2·25	*Maranoa.*				
					Roma	2·13	25	1·36	0·54
South Coast.									
Crohamhurst	4·47	20	3·30	0·31	*State Farms, &c.*				
Biggenden	2·45	14	1·31	1·06					
Bundaberg	2·39	27	0·53	1·83	Gatton College	2·71	14	0·88	0·42
Brisbane	3·57	63	0·59	1·64	Gindie	2·06	13	Nil	1·12
Childers	2·75	19	0·53	3·75	Kamerunga Nurs'y	3·22	23	2·68	0·01
Esk	3·02	27	0·75	1·28	Kairi	...	...	0·17	1·55
Gayndah	2·54	27	0·96	0·93	Sugar Experiment Station, Mackay	2·50	16	...	0·06
Gympie	2·88	27	1·68	0·71					
Glasshouse M'tains	3·97	6	1·95	1·67	Bungeworgorai	...	...	...	0·03
Kilkivan	2·50	27	0·12	0·68	Warren	...	...	Nil	0·70
Maryborough	2·80	27	0·54	2·82	Hermitage	2·81	7	1·20	0·64

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

General Notes.

BANANAS AS FOOD.

There are many methods of preparing the banana as food besides the usual way of eating it as a ripe fruit. W. Fowcett, B.Sc., late director of public gardens and plantations in Jamaica, in his valuable book on "The Banana—its Cultivation, Distribution, and Commercial Uses," gives much information on the methods of utilising the fruit and on the by-products obtainable from it. He first mentions the roasting of bananas on the grill, stewing them as is done with pears, making banana fritters, &c. Then the processes of preserving the fruit in the same manner as figs, raisins, and other dried fruits are produced are described. Banana flour from the fully-grown unripe banana, he mentions as a regular article of consumption in and export from the West Indies. It is shown that in all the banana-exporting countries put together there are probably as many as 8,000,000 bunches which fail to come up to the standard demanded by shippers and the trade. Then it was found that the small unsaleable fruit could be utilised in making alcohol, and, to some extent, this has been turned to some account.

Mr. A. F. Spawn, of Tampa, Florida, who resided for some years in Queensland and Victoria, manufactured banana figs and banana flour in 1887. He did not make either wine or spirits from the fruit, but a very much better product in the shape of banana coffee. This is a product which, considering the high opinion held of it both in America, Great Britain, and Australia, we are surprised has not been more largely exploited. The Mortimer Pure Food Company, Chicago, considered Mr. Spawn's banana coffee to be an article of the higher order of food, and destined to do more good for the coffee-drinking nations than any other food, it being a pure article and a most delicious beverage. The "Home Journal," New York, wrote:—"The transformation of the most nutritious of fruits in the world into a coffee is a great triumph. It is a perfect drink, and solves the coffee question . . . it is a satisfying beverage, supplying an aroma and taste heretofore lacking in all coffee substitutes."

In 1913, Mr. Spawn sent to the Department of Agriculture and Stock some tubers of the "Dasheen" from which he also prepares a good food. These were distributed to the Botanic Gardens and the Kamerunga State Nursery, where they were acclimatised. Under the name of "Tania," we described the tuber in the November issue of the Journal for 1906.

But, to return to the products of the banana, practically only a small proportion of the world's banana production can be utilised for the manufacture of flour and banana figs, and it remains to consider the use of the fruit in manufacturing an alcoholic spirit. Ligon, in his

"History of Barbados" (1657), says that the bananas for this purpose are gathered when fully ripe, then peeled, and washed in water well boiled. The mash is left overnight, when it is strained and the liquor bottled. In a week it is ready for use. It is a very strong and pleasant drink, but must be used sparingly, for it is much stronger than "sack" (sherry), and is apt to mount to the head.

The possibility of utilising the banana fruit in the production of alcohol has been more than once under the consideration of the Academy of Sciences of France, and Mr. Fawcett takes the following information from a paper read before the Academy by M. B. Corenwinder ("Comptes Readers," vol. 88, 293, 1879):—"It had already been shown by Buignet that during the whole growth of this fruit the saccharine matter is constituted entirely of cane sugar, but the proportion varies considerably. From results of analyses by Corenwinder himself, it appears that a sound ripe banana fruit contains as much as 22 per cent. of its weight of sugar, 16 per cent. being crystallisable, and the remainder uncrystallisable. In the mature sugar-cane, the proportion of cane sugar present is, according to Payen, 18 per cent."

In 1894 experiments on a large scale were carried out by Herr Kahlke, at his manufactory of yeast and alcohol at Königsberg, on the use of banana meal in brewing. Herr Kahlke wrote in the weekly paper "Alcohol" as follows:—

"Banana flour, without doubt, from its richness in starch and its good flavour, is particularly suitable for the manufacture of yeast. This flour is easily rendered saccharine. It has all the requisite properties of an excellent class of yeast, and, moreover, keeps well. The alcohol obtained from it leaves nothing to be desired. . . . Satisfactory experiments have also been made in some breweries, where 20 per cent. of malt has been replaced by the flakes and flour of bananas. The flavour of beer was not altered, and the quantity of liquid was increased, and the malt was replaced by a less expensive substance."

We have already, in previous issues of the Journal, given several recipes for the various methods of utilising bananas in the home, and have shown that a valuable fibre can be obtained from the banana, known as *Musa textilis*.

TO FIND THE CONTENTS OF STACKS.

A knowledge of the weight of hay in a stack is useful in several ways to a farmer—for fire insurance, for instance. It is no uncommon occurrence for one or more stacks to be destroyed by fire either accidentally or wilfully caused. For a very small premium stacks may be insured against fire; and to get at the weight of the contents as nearly as possible is important, in order that the value may neither be over nor under estimated.

Various modes may be adopted, but the only accurate one is by the use of platform scales. The number of tons may be nearly determined

by ascertaining the number of cubic feet or yards in the rick, and obtaining the weight per cubic foot by actual weighing.

Weight per Foot.		Yards to a Ton.	Weight per Foot.		Yards to a Ton.
Lb. Oz.			Lb. Oz.		
5 3	=	16	7 8	=	11
5 8½	=	15	8 4	=	10
6 0	=	14	9 3	=	9
6 6	=	13	10 5	=	8
6 14	=	12			

The number of yards per ton will depend on the solidity of settlement of the stack. If a good-sized stack has well settled, about 12 cubic yards to a ton will be fair.

The following rule will give the weight approximately by measurement:—

With a tape measure, measure the length and breadth of the stack, then the height to the eaves, and lastly the perpendicular height from the eaves to the top.

To calculate the quantity proceed thus—

To the height from the ground to the eaves, add one-third of the height from the eaves to the top; multiply this sum by the breadth and that product by the length. This will give the content in cubic feet, which divided by 27 (the number of cubic feet in a yard) the quotient will be in yards. Divide this by 10 to bring it into tons.

EXAMPLE.

Suppose a stack of hay, 30 ft. in length; 20 ft. in breadth; the height from ground to eaves, 14 ft.; and height from the eaves to the top, 9 ft.—

14 feet	=	height to the eaves } add
3	=	⅓ of height to top } add
17		
20	=	breadth
340		
30	=	length
10,200	=	cubic feet

27)10,200(377·7 cubic yards.
10)377·7(37·7 tons, or 14 cwt.

As the sides of stacks are generally bevelled inwards, in measuring for length and breadth take the *mean* rule—that is, measure at half-way up from ground to eaves; and for heights measure perpendicularly.

If the hay is not well settled, divide by 9.

If well settled, divide by 7.

If very compact, divide by 6.

ERRATUM.

In the December issue of the Journal an error occurred in the quantity of methylated spirit in making up a blister for the removal of a splint from a horse. Instead of 1 drachm, the quantity should have been given as 1 oz.

PLATE 2 (FIG. 1).—Large Papayas developed after thinning out the remainder.

(FIG. 2).—Papaya Tree artificially caused to branch.

Answers to Correspondents.

MANURE FOR CITRUS TREES.

E.M., Auckland, N.Z.

A standard manure for citrus trees should contain not less than 80 lb. nitrogen, 40 lb. phosphoric acid, and 80 lb. potash per acre.

The 80 lb. nitrogen can be obtained approximately from 600 lb. dried blood, or 400 lb. sulphate of ammonia, or can be supplied by green manuring.

The 40 lb. phosphoric acid can be obtained approximately from 235 lb. of 37 per cent. soluble superphosphate, or Thomas' phosphate, 200 lb. of meatworks fertiliser without blood, or 165 lb. good bonedust.

The 80 lb. of potash is obtained from 160 lb. of 96 per cent. sulphate of potash.

This combination gives a complete manure, containing 8 per cent. nitrogen, 4 per cent. phosphoric acid, and 8 per cent. potash. For young trees not in bearing, a smaller quantity should be used. Trees 5 years old require from 4 to 6 lb. of the complete manure per tree. Old trees in full bearing require as much as 20 lb. per tree. The manure should be given in two applications—the first in July or August, and the second in December or January.

AREA OF CLEARED LAND.

G.C.P., Bunerba—

The correct area of clearing a block in triangular form, with sides 14, 15, and 19 chains respectively, is 10·40 acres, as calculated by the following rule:—

Add the three sides together, and take half that sum, then multiply the half sum and the three remainders together; and the square root of the last product will give the area.

Example.—$19 + 15 + 14 = \frac{48}{2} = 24 - 19 = 5$

$24 - 15 = 9$

$24 - 14 = 10$

$24 \times 5 = 120 \times 9 = 1080 \times 10 = 10800$, the square root of which is 10·40 acres.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

Date.	January.		February.		March.		April.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·57	6·45	5·22	6·42	5·42	6·19	5·58	5·45
3	4·58	6·46	5·23	6·41	5·43	6·18	5·59	5·44
4	4·58	6·46	5·23	6·41	5·44	6·17	5·59	5·43
5	4·59	6·47	5·24	6·40	5·45	6·15	6·0	5·42
6	4·59	6·47	5·24	6·40	5·45	6·14	6·0	5·41
7	5·0	6·47	5·25	6·39	5·45	6·13	6·1	5·40
8	5·1	6·47	5·26	6·38	5·46	6·12	6·1	5·39
9	5·2	6·47	5·27	6·37	5·46	6·11	6·2	5·38
10	5·3	6·47	5·28	6·36	5·47	6·10	6·2	5·37
11	5·3	6·47	5·29	6·36	5·47	6·9	6·3	5·36
12	5·4	6·47	5·30	6·35	5·48	6·8	6·4	5·34
13	5·5	6·47	5·30	6·34	5·48	6·7	6·4	5·34
14	5·6	6·47	5·31	6·34	5·49	6·6	6·4	5·33
15	5·7	6·47	5·32	6·33	5·49	6·5	6·5	5·32
16	5·8	6·47	5·33	6·32	5·50	6·4	6·5	5·31
17	5·9	6·47	5·34	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·51	6·2	6·6	5·29
19	5·11	6·46	5·35	6·29	5·52	6·0	6·7	5·28
20	5·12	6·46	5·36	6·28	5·53	5·59	6·8	5·27
21	5·12	6·46	5·36	6·28	5·53	5·58	6·8	5·26
22	5·13	6·45	5·37	6·27	5·53	5·57	6·9	5·25
23	5·14	6·45	5·37	6·26	5·54	5·56	6·9	5·24
24	5·15	6·45	5·37	6·25	5·54	5·55	6·10	5·23
25	5·16	6·44	5·38	6·24	5·54	5·54	6·10	5·22
26	5·16	6·44	5·38	6·23	5·55	5·53	6·11	5·21
27	5·17	6·44	5·39	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5·56	5·51	6·12	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·57	5·49	6·13	5·18
31	5·21	6·43	...	...	5·58	5·48	...	...

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H.	M.	
1 Jan.	○	Full Moon	10	20	p.m.
9 „	☽	Last Quarter	7	12	a.m.
16 „	●	New Moon	12	41	„
23 „	☾	First Quarter	3	32	p.m.
31 „	○	Full Moon	2	41	„

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

7 Feb.	☽	Last Quarter	3	11	p.m.
14 „	●	New Moon	2	31	„
22 „	☾	First Quarter	12	58	„

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

2 Mar.	○	Full Moon	4	32	a.m.
8 „	☽	Last Quarter	10	27	p.m.
16 „	●	New Moon	5	42	a.m.
24 „	☾	First Quarter	8	48	„
31 „	○	Full Moon	3	38	p.m.

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

7 Apr.	☽	Last Quarter	6	12	a.m.
14 „	●	New Moon	9	36	p.m.
23 „	☾	First Quarter	1	39	a.m.
30 „	○	Full Moon	12	19	„

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER, 1914.

Article.		DECEMBER. Prices.
Bacon	lb.	8d. to 10d.
Bran	ton	£9
Butter	cwt.	110s.
Chaff, Mixed	ton	£5
Chaff, Oaten	,,	£4 to £7 10s.
Chaff, Lucerne	,,	£3 to £4 10s.
Chaff, Wheaten	,,	£4 to £5
Cheese	lb.	5d. to 7d.
Flour	ton	...
Hams	lb.	1s. 2d. to 1s. 3d.
Hay, Oaten	ton	£2 15s. to £3
Hay, Lucerne (Prime)	,,	£3 15s.
Honey	lb.	2d. to 3d.
Maize	bush.	3s. 4d.
Oats	,,	3s. 8d.
Onions	ton	£6 15s. to £8
Peanuts	lb.	3½d.
Pollard	ton	£8 10s.
Potatoes	,,	£4 to £7 10s.
Potatoes (Sweet)	cwt.	2s. 3d.
Pumpkins	ton	£2 to £3 10s.
Wheat, Milling	bush.	5s. 4d.
Eggs	doz.	9d. to 1s. 3½d.
Fowls	pair	3s. to 5s.
Geese	,,	4s. 9d. to 5s. 9d.
Ducks, English	,,	3s. 6d. to 4s.
Ducks, Muscovy	,,	4s. to 5s. 6d.
Turkeys (Hens)	,,	8s. 6d. to 12s. 6d.
Turkeys (Gobblers)	,,	14s. to 19s.

SOUTHERN FRUIT MARKETS.

Article.	DECEMBER. Prices.
Bananas (Queensland), per case	12s. to 14s.
Bananas (Queensland), per bunch	...
Bananas (Fiji), per case	24s. to 24s. 6d.
Bananas (Fiji), per bunch	...
Mandarins (Queensland), per case	...
Mangoes, per case	8s. to 11s.
Oranges (Navel), per case	12s. to 16s.
Oranges (Seville), per case	6s. to 7s.
Oranges (Valencias), per case	12s. to 20s.
Oranges (other), per case	...
Passion Fruit (Queensland), per half-case	5s. to 9s.
Papaw Apples, per half-case	7s. to 12s.
Pineapples (Queens), per case	9s. to 11s.
Pineapples (Ripleys), per case	6s. to 14s.
Pineapples (Common), per case	8s. to 12s.
Tomatoes, per quarter-case	3s. to 5s.
Rockmelons, per double case	8s. to 10s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	DECEMBER. Prices.
Apples (American), Eating, per case	20s. to 21s.
Apples (Tasmanian), per case	12s. to 14s.
Apples Cooking, per case	10s. to 12s.
Apricots, per quarter-case	5s. to 6s. 6d.
Bananas (Cavendish), per dozen	2d. to 4d.
Bananas (Sugar), per dozen	$1\frac{1}{2}$d. to $2\frac{1}{2}$d.
Cape Gooseberries, per quarter-case	4s. to 7s.
Cherries, per quarter-case	4s. to 9s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per case	...
Custard Apples, per quarter-case	...
Lemons, per case	10s. to 12s. 6d.
Lemons (Italian), per case	12s. to 15s.
Limes, per case	...
Mandarins, per case	6s. to 8s. 6d.
Mangoes, per case	4s. to 6s.
Oranges (Navel), per case	8s. to 12s.
Oranges (other), per case	2s. to 4s.
Papaw Apples, per quarter-case	1s. 6d. to 4s.
Passion Fruit, per quarter-case	3s. to 5s.
Peaches, per quarter-case	1s. to 3s. 6d.
Peanuts, per pound	3d.
Pears, per quarter-case	...
Persimmons, per quarter-case	...
Pineapples (Ripley), per dozen	5s. to 8s.
Pineapples (Rough), per dozen	3s. 6d. to 5s. 6d.
Pineapples (Smooth), per dozen	6s. to 8s. 6d.
Plums, per quarter-case	2s. to 3s. 6d.
Rockmelons, per dozen	2s. 6d. to 6s. 6d.
Rosellas, per sugar bag	...
Strawberries, per tray	...
Strawberries, per dozen boxes	2s. to 3s.
Tomatoes, per quarter-case	1s. to 4s.
Watermelons, per dozen	4s. to 14s.

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1914.

Animal.	NOVEMBER. Prices.
Bullocks	£15 10s. to £17
Cows	£10 2s. 6d. to £12 15s.
Merino Wethers	20s.
Crossbred Wethers	17s. 9d.
Merino Ewes	16s.
Crossbred Ewes	18s. 6d.
Lambs	18s. 9d.
Pigs (Porkers)	35s.

Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into setts, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked and deeply ploughed. Cape barley, panicum, kafir corn, imphee, sorghum, and vetches may be sown; but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow swede turnips and mangelwurtzels.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats, and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. In the pamphlet on "Market Gardening" issued by the Department, it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, and are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphis appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out and tie up dahlias. Keep the weeds down, and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candytuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer

chrysanthemum, verbenas, petunias, pentstamons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year, if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size; for instance, a pea is about one-eighth of an inch in diameter, therefore, cover it with one-eighth of an inch of soil.

Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruit-growers, I took advantage of the commencement of the new year to revise them and bring them up to date. At the same time, the notes have been somewhat altered, as, instead of making them of a general nature, applicable to the whole of the State, they are, to a certain extent, localised, as, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit are applicable to the State as a whole, there are many matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea the State has been divided as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

THE SOUTHERN COAST DISTRICTS.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting

of both pines and bananas is to be recommended. Still, if the land is thoroughly prepared—viz., well and deeply worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later on will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion, when placed in position, must be tied very firmly. The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied ringbark the stock just above the bud, so as to force the sap of the stock into scion so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for theYellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both of these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is to be preferred. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

THE TROPICAL COAST DISTRICTS.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. When citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but as a rule insect life of all kinds is so

prevalent at this time of year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet it should be artificially dried before packing, but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit, or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad at this time of year.

THE SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care should be taken to see that the fruit fly and codling moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codling moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane but to all other parts of the State. For long shipment nothing can beat crates holding 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with those pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.

Queensland Agricultural Journal

Vol. III. FEBRUARY, 1915. Part 2.

Agriculture.

INTERESTING ENTRIES FOR THE LIVE STOCK EXHIBIT AT THE PANAMA PACIFIC INTERNATIONAL EXPOSITION.

From the Editorial Bureau, Panama-Pacific International Exposition, we have received the following particulars of entries for the live stock exhibit:—

Entries were received recently (6th October, 1914) by I. D. Graham, Assistant Chief of the Department of Live Stock for the Panama-Pacific International Exposition at San Francisco, for the class of Karakule fur-bearing sheep, of which variety there are several flocks of small size now in the country. Entries will be exhibited at the Exposition both from various parts of the United States and from Persia and Turkey, the original home of the animal. Exhibits will also be made of the Karalinos, a cross between the Karakule and the Lincoln sheep, the pelt of which, dyed and trimmed, is the source of most of the beautiful furs worn by women. The Karakule is the only source of Astrachan, and its wool commands a high price. Fat-tailed sheep will also be shown from Persia, where the animal is bred and raised especially for the fat in its tail, which often becomes so heavy as to make it difficult for the animal to move about. The oil obtained from the fat-tailed sheep is used in cooking and by watchmakers for mechanical purposes.

Three of the six great silos being erected for the Department of Live Stock are now completed, and within the next ten days the ensilage will be prepared from corn which is being shipped to the grounds from the interior to be chopped into feed and put away in the silos for feeding

the live stock during the exposition. The preparation of the ensilage, a process of considerable novelty in California, will be observed by a large number of interested spectators. The operation will constitute one of the first working exhibits of the Exposition.

Communications received from abroad by the Live Stock Department indicate that negotiations are being successfully carried on for the bringing to the Exposition next year of two new breeds of horses from Brittany and Boulogne, France, where these animals are raised. The "Bretonnes" and the "Boulonnaise," the names given to these breeds, are the subject of particular interest on the part of the French Government, which is anxious to establish a demand abroad for registered animals of this class, as has been done with the Percherons. The province of La Perche has been enriched for many years by the buyers from foreign countries who have come there for registered animals. The support of the Minister of Agriculture of France has already been promised, and the assistance of such men as Mr. Lemaitre, Mr. Le Gentil, Baron D'Herlincourt, and the Messrs. Calais Brothers has already been obtained.

Great interest has already been aroused all over the United States among farmers, ranchers, and horsebreeders in these new breeds, owing to the fact that they are declared by judges to be the animals for practical use, the Bretonne for light work and the Boulonnaise for heavy draft purposes. A few of these animals have already been brought to this country, and an exhibit of the types at the Panama-Pacific International Exposition would create a sensation in stock-breeding circles.

Assistant Chief I. D. Graham, of the Department of Live Stock of the Panama-Pacific International Exposition, has just received word that there is a possibility of exhibiting specimens of the famous Chillingham wild white cattle in the department next year at San Francisco. Eugene Grubb, who is abroad as special commissioner for the department, reports that Lord Chillingham, who owns these cattle, has offered specimens to be shown at the Panama-Pacific International Exposition, without purchase cost. The cattle were first inclosed in Chillingham Park in 1220, since which time there has not been a single infusion of new blood, and yet they have reproduced themselves in purity of type. They have been traced to the white bull of Caledonia, with whose history and fabled stories practically every Scotchman is familiar; and, with the exception of two animals which were trapped and given to the Zoological Gardens of London, none of these cattle have ever gone out of Chillingham Park except as carcasses. The animals are snow white, with black noses, black horns, and red ears. They have crescent-shaped horns, and there is some evidence they formerly had manes. They are exceedingly wild and fierce, and are supposed by some authorities to be the progenitors of all breeds of cattle now existing in Occidental countries. They will become permanent residents of Golden Gate Park after the Exposition.

The Goat-breeders' Association, which is taking an active interest in the Live Stock Show, which is to be continuous throughout the Exposition period, promises that the Angora goat representation will be of unusual interest. Some Australian goats are to be shown, which produce mohair of so fine a quality it is utilised in the manufacture of "false" hair for milady's adornment.

THE USE OF LIME.

In connection with the use of lime on the land, Mr. J. C. Brünnich, Agricultural Chemist, says that most of the land on the North Coast Line requires lime, which, according to the class of land, is applied in the form of quicklime for heavy clayey soils, or in the form of coral sand or limestone screenings for lighter sandy soils. Carbide refuse is pure lime (slaked lime), and can be used for liming land. Disslaked quicklime or carbide refuse is used at the rate of about 1 ton per acre; limestone screenings up to 2 tons per acre. The lime is applied broadcast and slightly cultivated under. Lime only acts on nitrogenous manure, and should not be mixed and applied at the same time with such manure. If lime is applied three or four weeks before other manures, no losses can take place.

MARKET GARDENING.*

PEAS.

Many amateur market gardeners have a very hazy idea of the proper seasons during which to sow and plant different vegetables, and, as an example of this want of experience, take peas and French beans. There are really only about four months in the year when peas are unlikely to succeed. The time for sowing these in Queensland is from January to September. During these months, sowings should be made once a fortnight so as to keep up a constant succession. The autumn sowing, say in April or May, should consist of the earliest varieties. These are usually the wrinkled kinds. These may also be sown in June. In July and August, sow marrows, and American Wonder, Giant Luscious, Yorkshire Hero, Pride of the Market, and Veitch's Perfection.

All tall varieties must be supported on brushwood, sticks, or wire netting, fixing the netting about 10 in. above the ground.

As for soil, peas succeed best on a deep, rich loam. Soil that has been manured for a previous crop will suffice for the winter-sown crops of peas, as rich soil tends to produce an undue proportion of haulm; but for summer crops, an additional dressing should be given, and

* Whilst we are always ready to respond to all inquiries from correspondents on any subject in connection with rural or household pursuits, we would point out that, as far as market gardening is concerned, our correspondents would save themselves much trouble and possible delay if they would apply for the pamphlet on "Market Gardening" issued by the Department of Agriculture and Stock, which deals with almost every phase of the subject.—Ed. "Q.A.J."

the ground trenched or dug very deeply; or, a shallow trench may be made, as for celery, for each row of peas, and well manured. The depth at which to deposit the seed must be regulated by the season. In winter, half an inch of soil above the seed will suffice; indeed, in damp or retentive soils, the seeds may be dropped on the surface and lightly covered; but during the summer the drills should be 3 to 4 in. in depth. For dwarf varieties the rows may be from 2½ to 3 ft. apart; for taller sorts, 4 to 6 ft. But it is better, when tall varieties requiring support are grown, that the rows should be 8 ft. or more apart, and the interspaces cropped with other vegetables, as it is found that two rows at a good distance apart will yield as much as three near together; besides, seed is saved and ground gained.

The autumn sowing should, as stated, consist of the earliest varieties. To keep up a continuous succession, it is a good rule to sow whenever the previous crop is fairly above ground. The distance at which seeds should be placed apart must be determined by the ultimate size of the variety; thus, while 1 in. apart will suffice for dwarf sorts, and 3 to 4 in. for those of intermediate size, the tallest may be 6 in. apart. In sowing during dry weather, the drills should be made in the evening and well watered, and the peas sown early next morning. It is also a good plan to soak the peas in lukewarm water for a day before sowing. To ensure good crops during dry weather, liberal supplies of water and, if possible, liquid manure must be given, and the ground mulched on each side of the rows.

BEANS.

The season for French beans may be reckoned from the middle of August until April or May, but in many parts of Queensland they may be grown all the year round. In districts where frosts prevail no success will attend planting during the winter months. Successive sowings during the season may be made at intervals of two or three weeks when the ground is not too dry. French beans, sometimes called kidney or dwarf beans, require a rich soil, the best crops being obtained from good loams or alluvial soils, but any good garden soil with assistance from manure and water will suit them. The rows should be 3 ft. apart and the seeds at least 6 in. apart in the rows. The depth of the drills depends upon the weather and the state of the soil, from 2 to 4 in. being the average. Should the soil be dry, water it well before sowing. As with many other vegetables—such as cucumbers, for instance—the beans should be gathered as they become fit—that is, while young and tender, whether required or not. This will prolong the bearing season; and, unless some are required for seed, they should not be allowed to ripen, otherwise the powers of bearing of the plants will be considerably lessened. Amongst the best early sorts are the Early Pale Dun, Bountiful, Canadian Glory, and, for later sowing, Canadian Wonder, Negro, and "Startler" wax-pod butter beans.

There is a considerable number of varieties of beans for gardening purposes besides French or kidney beans, including the stringless butter beans, pole beans, scarlet runners, broad beans, and Lima beans. All these are annuals, except Lima beans, which are perennial in districts where there is no severe winter cold.

POLE OR RUNNER BEANS

Are summer plants, and may be sown from September to February or March. The rows for these should be 4 or 5 ft. apart, and, before planting, poles about 6 ft. long should be set up along the rows at a distance of 3 or 4 ft. apart. Around each pole plant 6 or 8 seeds, 2 in. deep, and when they come up thin them out, leaving four of the strongest plants to each pole. It may sometimes become necessary to tie the young tendrils to the poles at first, but as soon as they begin to run they will twine around the sticks naturally without any artificial help. Broad beans do not succeed well in the hot weather, their season being from March to September. Sow in drills 3 or 4 ft. apart, 3 in. or so deep, and the beans about 9 in. apart in the rows. When the plants come into flower, their tops should be pinched off in order to check the upward growth and cause the beans to set. If this pinching is neglected, in all probability the plants will continue to grow, most of the flowers will drop off, and there will be little or no crop. The beans should be gathered as they become fit whether they are wanted or not, so as to prolong the bearing season as much as possible.

Lima beans are a good crop to grow in the summer months, as they will stand any amount of heat and dry weather, and continue in bearing for a very long time. The dwarf or bush Limas are perhaps the best to grow, as they require no poles, and consequently give less trouble. Lima beans may be planted in August or September, and again in November, and will continue to grow and bear until cut down by the frosts of winter. Dwarf Limas may be planted in drills 3 ft. apart, and the seeds 18 in. apart in the rows or in hills of four or five seeds 3 ft. apart each way. The seeds should not be planted more than 2 in. deep, and should be placed in the ground edgeways, with the eyes down.

The pole Limas require the same treatment precisely as other pole beans. French beans and most of the pole beans are *pod* beans, of which the edible part is the young and tender seed-pod. Broad and Lima beans, on the other hand, are *shell* beans, the part used for food being the bean itself and not the pod.

All of these, except the Lima, must be used when young and tender. The Lima bean may be used green (the bean itself, not the pod) or allowed to ripen, and stored for winter use. They will keep for a long time, and only require soaking in water before cooking to render them soft and palatable. They are the most delicious of the pod beans. Lima beans should be more extensively cultivated than they are, because they

will succeed in dry seasons when other beans fail, and continue to bear right through the summer.

The varieties of French beans, including butter beans, are very numerous, and each grower must choose what best suits his requirements.

Of the Limas, the largest and most delicately flavoured are Burpee's Bush Lima.

A good manure for beans is a light dressing of farmyard manure, 4 to 6 cwt. of superphosphate, and 1 cwt. of sulphate of potash (or 4 cwt. of kainit) per acre. The use of 2 cwt. of nitrate of soda per acre gives a very substantial increase of crop. An acre so treated has given an increase of nearly 50 per cent. Where 3¼ tons of French beans were obtained from an acre on which no nitrate of soda was used, 4½ tons were gathered on the same area as the result of its use.

Of late years much loss has been sustained by French-bean growers owing to the destruction caused by the Bean Fly. On this subject, Mr. E. Jarvis, Assistant Government Entomologist, says:—

"Attempts to cultivate French beans in Southern Queensland are apt to prove more or less unsuccessful, and in some districts it is almost impossible to grow this vegetable during the summer months. A crop may look promising at the start, but before long the young plants may show unmistakable signs of arrested growth, and become wilted and sickly looking, droop gradually, and at last topple over one after another is a most disheartening fashion.

"In the absence of any decided external evidence of injury, the grower is naturally somewhat at a loss to account for the cause of such failure, and is usually too disgusted to closely investigate the matter. In such cases, however, neglect is never advisable; and specimens of the affected plants, with particulars as to time of sowing and first notice of attack, &c., should be sent without delay to the Under Secretary of the Agricultural Department.

"The above symptoms are not due to climatic changes, or to the presence of fungi, but to the ravages of a small fly, the grubs of which tunnel in the stems and can easily be found if the skin of a badly-attacked beanstalk be carefully peeled in places with a sharp pocket knife. Such treatment will disclose a number of tiny pale-yellow maggots, about one-eighth of an inch long, lying close to the surface; and careful scrutiny will reveal the presence of still smaller, reddish, seed-like bodies, immediately under the dried skin, which are the pupæ from which these destructive little insects will ultimately issue."

The remedies he suggests are:—

1. Grow a small catch-crop of Canadian Wonder beans very early in the season to meet the first brood of flies, and when these plants are found, upon examination, to be harbouring good-sized grubs, pull them up and burn them without delay.

2. Root up and burn all old bean-plants immediately they have ceased to become profitable.

This and the preceding method of control are of the greatest importance, and will well repay growers for any trouble or loss of time incurred.

3. Protect the stems by hilling them up with soil until covered. (Mr. Froggatt says that Sydney market gardeners adopt this plan, which, in good growing weather, enables a damaged plant to root afresh above the injured portion.)

4. Mr. Tryon reports that the best results have been derived from growing the beans in a shallow trench and applying to the soil (so as not to touch the plants) whitewash made from acetylene refuse, or lime slaked with water, containing carbolic acid or phrenyle. Some benefit, he tells us, has been derived from "turning some of the soil back, and either painting the stalks with simple whitewash, to which a little glue has been added to promote adhesion, or sprinkling lime around them."

On small areas, for example, it might be worth while to try—as an experiment—stretching three or four lengths of coarse packing-twine over a row of dwarf beans close to the upper leaves, having first dipped the string in some attractive sticky solution. A few sticks stuck in the ground at intervals would afford all the support needed, and the device, being simple and inexpensive, would, I think, be worth trying.

NUMBERS OF STOCK IN AUSTRALIA.

The cattle in Australia total 11,493,167. Of these there are in Queensland, 5,322,000; New South Wales, 2,836,800; Victoria, 1,528,550; Western Australia, 829,490; Northern Territory, 417,640; South Australia, 352,905; Tasmania, 205,750. The total number of sheep in the Commonwealth is estimated at 85,046,724. Of these there are 39,842,500 in New South Wales, 12,113,682 in Victoria, 21,786,600 in Queensland, 5,073,057 in South Australia, 4,418,402 in Western Australia, 1,745,356 in Tasmania, and 67,109 in the Northern Territory.

DESTROYING TREES AND SUCKERS BY POISON.

In the issue of the Journal for November, 1914, we published an article taken from the Melbourne "Leader," giving an account of the successful clearing of 320 acres of heavily timbered land by Mr. D. Morris, Illabo, New South Wales, by poisoning. The ingredients used were given as 1 lb. arsenic, 7 lb. soda, and 4 gallons water.

Our attention was drawn to the small quantity of arsenic by Mr. P. Whiteley, of Wycarbah, Central district. He found that it needed 3½ lb. of arsenic instead of 1 lb. We submitted the question to Mr. J. C. Brünnich, Agricultural Chemist, and he said that the amount of arsenic mentioned was ridiculous, recommending also that the solution contain 4 lb. of arsenic, 2 lb. of caustic soda, to be mixed dry, and 4 gallons of water to be added slowly.

Pastoral.

CATTLE-GRAZING FARMS.

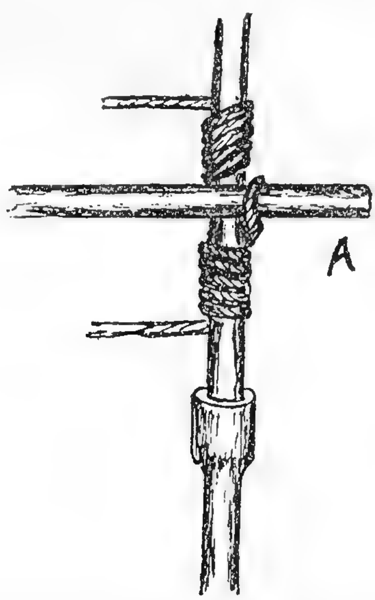
BY P. R. GORDON.

It is not too much to assume that the resumption of a large area of Crown lands in the North, and its subdivision into cattle-grazing farms, will revolutionise the cattle-grazing industry of Queensland. It is a fact well known to experienced Australian graziers that, in proportion to their relative areas, the small holding will maintain, proportionally, more stock than the large runs. This has been abundantly exemplified by the operations under the Dutton Land Act of 1884. The grazing farms on the resumed halves of runs under that Act have, in most instances, carried as many sheep, under grazing farms, as were maintained over the whole of the run prior to that Act coming into operation. The reason is obvious. The fixity of tenure under the grazing farms gives the occupants every encouragement for carrying out improvements on the pastures: water conservation, ringbarking, and construction of working conveniences. There were not wanting many pessimists who viewed the coming into operation of the 1884 Act as a menace to the woolgrowing industry of Queensland by lowering the standard of the Australian merino wool. The wool sales have proved that the grazing farmers have well held their own against the larger flockmasters in the quality of their clips. Here, again, a little consideration should have suggested that, as a class, those who would take advantage of obtaining grazing farms would be men who had gone through a thorough training in sheep farming, either as managers or overseers, on sheep properties. One of the great benefits that will accrue to the State from the subdivision of runs into smaller compact cattle holdings will be that it will enable men of limited capital to embark in the business of cattle breeding and fattening; thus settling on the soil a much greater number of primary producers. But perhaps the greatest benefit, in a vast grazing country such as Queensland represents, is the facilities that will be afforded for carrying into effect a great improvement in the quality of our beef breeds of cattle, on which so much of the success of our meat export depends. That there is great scope for improvement in that respect in our general herds is but too obvious, and it is humiliating to be told by those engaged in the London meat trade that Argentina—a country that took up the business of cattle-raising only the other day, so to speak—produces better beef than Australia with its century of advantage in experience. The greatest fault in our general herds is a dearth of flesh. There is no lack of fat, but present-day meat-consumers do not eat fat, but red flesh—or lean as it is known in the trade—well mixed with fat, giving the meat that beautiful marbled appearance so characteristic of the Scotch sides which for many years commanded the highest prices in the Smithfield Market. These are principally the product of the Aberdeen-Angus cattle, or their first cross with Shorthorns. There has hitherto been a disinclination on the part of Queensland, and many other Australian cattle-breeders, to pass the black colour of the

Aberdeen cattle through their herds, although they freely admit that the meat of that breed is superior to that of all other breeds. One hesitates to call it prejudice on the part of Australian breeders. Rather it arises from the fact that Australian cattle-breeders, as a rule, have a discriminating eye for symmetry and gayety in cattle, ignoring the fact that cattle bred for purely beef purposes must necessarily sacrifice points that are essential in beauty of outline and style of carriage. Those who are likely to take up and occupy cattle-grazing farms will be men who will study utility instead of beauty of outline in their cattle, and it is safe to predict that the great Scotch beef breed will be introduced in the course of a few years on many of the grazing farms. There is another direction in which these cattle-grazing farms will tend to increase the number of cattle stock in Queensland. There are many parts of Queensland incapable of fattening stock, but on which well-framed store cattle can be raised. No doubt many of these grazing farms will be used for merely fattening of stock cattle, thus bringing into use considerable areas of inferior pasturage in breeding of cattle that are at present little, if at all, utilised for any purpose.

TO GRIP AND TURN A ROUND CYLINDER.

It is a difficult matter to hold a round cylinder, or shaft of any description, securely, if it is desired to turn it with much pressure; as, for example, if the joints of a fishing-rod become jammed, or lengths of piping, which screw into each other, require loosening or fixing. The method shown in the cut is very useful in these cases. A length of rope



or cord is wrapped four or five times round the shaft, then doubled to form a loop into which a lever (A) is inserted, and then wrapped round the shaft again. The two ends are held in one hand, or, in the case of a big shaft, by an assistant, whilst the lever is turned. In this way very great pressure is obtained.—" Farm and Home."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF DECEMBER, 1914.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Nellie II. ...	Shorthorn... ...	20 July, 1914	964	3·8	42·89	Natural pasture.
Butter ...	,, ...	26 Nov. ,,	865	4·2	42·64	
Daisy ...	Holstein	26 Nov. ,,	1,025	3·3	39·51	
Madam Melba	,, ...	8 Sept. ,,	967	3·4	38·38	
Bluebelle ...	Jersey	27 May ,,	657	4·8	37·18	
Miss Melba...	Holstein	10 July ,,	980	3·2	36·55	
Miss Edition	Jersey	10 July ,,	568	5·4	36·24	
Rosebud ...	Ayrshire	20 Sept. ,,	886	3·5	36·23	
Glen ...	Shorthorn... ...	26 Oct. ,,	752	4·0	35·26	
Miss Jean ...	Ayrshire	24 Nov. ,,	853	3·5	34·88	
Honeycombe	Shorthorn ...	23 Sept. ,,	758	3·7	32·81	
Burton's Lily	,, ...	17 Nov. ,,	753	3·7	32·60	
Simple Interest	Jersey	24 Nov. ,,	552	5·0	32·56	
Miss Lark ...	Ayrshire	31 Oct. ,,	732	3·7	31·69	
Miss Bell ...	Jersey	13 Aug. ,,	504	5·3	31·55	
Sweet Meadows	,, ...	28 July ,,	502	5·2	30·82	
Lark ...	Ayrshire	27 July ,,	682	3·8	30·34	
Pauline ...	Shorthorn ...	12 Oct. ,,	701	3·6	29·51	
Lady Lil ...	Jersey	22 Aug. ,,	477	5·0	28·14	
Laurette II.	Ayrshire	10 Nov. ,,	672	3·5	27·48	
Countess of Brunswick	Shorthorn ...	26 July ,,	612	3·8	27·23	
Lady Melba	Holstein	6 Mar., ,,	662	3·4	26·27	
Lady Margaret	Ayrshire	19 July ,,	620	3·6	26·10	
Iron Plate ...	Jersey	No record ...	411	5·3	25·74	
Lady Dorset	Ayrshire	20 Sept., 1914	589	3·7	25·50	
Noble Dot ...	Jersey	No record ...	423	5·0	24·96	
Burton's Lady	Shorthorn... ...	23 July, 1914	590	3·6	24·84	
Lady Spec ...	Ayrshire	24 Oct. ,,	584	3·8	24·38	
Silver Nell...	Shorthorn... ...	5 Oct. ,,	598	3·4	23·73	
Lowla II. ..	Shorth'rn-Ayrshire	23 Sept. ,,	594	3·4	23·57	
Davidina ...	Ayrshire	17 July ,,	587	3·4	23·29	
La Hurette Hope	Jersey	No record ...	394	5·0	23·24	

HORSE WITH SLIPPED SHOULDER.

Slipped shoulder is caused by an injury to the muscles, which atrophy or waste away, giving the part the appearance of the shoulder joint being out of place. In such cases treatment is of long duration. The animal should be rested, and a stiff blister such as the following applied:—Bin-iodide of mercury, 1 dr.; lard, 8 oz. It is quite possible that the first blister will not have the desired effect, and a second one should be applied in six weeks' time. Afterwards the animal should not be worked for a few months, but should be allowed to run at grass until the part has been thoroughly repaired.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, DECEMBER, 1914.

Five thousand five hundred and twenty-nine eggs were laid during the month, an average of 138·2 eggs per pen. The weather was very trying up to the 15th, the heat going to 108·9 on that date. Since then we have had some good storms, which have made it much cooler. Moritz Brothers win the monthly prize. The following are the individual records:—

Competitors.	Breed.	Dec.	Total.
A. T. Coomber	White Leghorns	152	1,197
T. Fanning	Do.	131	1,172
Moritz Bros., S.A.	Do.	160	1,152
Loloma Poultry Farm, N.S.W.	Do.	154	1,149
Geo. Tomlinson	Do.	154	1,102
Kelvin Poultry Farm	Do.	128	1,093
Cowan Bros., N.S.W.	Do.	146	1,084
Loloma Poultry Farm, N.S.W.	Rhode Island Reds	131	1,081
R. Burns	Black Orpingtons (No. 1)	142	1,075
A. F. Camkin, N.S.W.	White Leghorns	152	1,061
E. Le Breton	Do.	147	1,049
Mrs. Munro	Do.	154	1,047
A. H. Padman, S.A.	Do.	141	1,043
Marville Poultry Farm, Victoria	Do.	148	1,032
Mrs. Bieber	Brown Leghorns	135	1,025
T. Fanning	Black Orpingtons	141	1,025
R. Burns	Do. (No. 2)	138	1,022
R. Burns	S. L. Wyandottes	130	1,022
Derrylin Poultry Farm	White Leghorns	152	1,020
J. R. Wilson	Do.	133	1,017
J. F. Coates	Black Orpingtons	114	1,011
J. Franklin	White Leghorns	139	1,010
E. V. Bennett, S.A.	Do.	146	1,000
F. McCauley	Do.	142	998
J. F. Coates	Do.	137	998
G. E. Austin	Do.	140	990
R. Jobling, N.S.W.	Do.	134	988
J. M. Manson	Do. (No. 1)	141	981
J. Kilroe	Do. (No. 2)	136	968
J. Gosley	Do.	114	966
Range Poultry Farm	Do.	142	952
J. Zahl	Do.	144	945
J. D. Nicholson, N.S.W.	Do.	125	945
D. Moreton, N.S.W.	Do.	135	942
Mrs. Bradburne, N.S.W.	Do.	120	930
C. M. Jones	Do.	134	921
J. Kilroe	Do. (No. 1)	123	912
J. Murchie	Brown Leghorns	140	893
J. N. Waugh, N.S.W.	White Leghorns	125	892
J. M. Manson	Do. (No. 2)	129	871
Totals	...	5,529	40,581

The Orchard.

STANTHORPE NECTARINES.

The granite country at Stanthorpe is deservedly celebrated for the excellence of the stone fruit grown in the district, and judging by a sample of the nectarines produced this season on the orchard of Mr. H. M. Jones, Rural Creek, Stanthorpe, and which is here depicted, it would seem as if this variety of fruit cannot be excelled even in the great fruitgrowing districts of the old and the new world. The sample left at our office is perfect in form, colour, and taste, and weighs 5½ oz. It

PLATE 3.—NECTARINE GROWN BY MR. H. M. JONES, STANTHORPE.

is not a picked specimen, but a representative of many which have been picked at the latter end of December. As stated, the Stanthorpe district is celebrated for its apples and stone fruits. Yet such fruit is rarely obtainable in Brisbane, the possible reason being that such a good market is found in the Southern States that, as far as apples at least are concerned, Brisbane has to depend upon apples imported from America

and Tasmania. And it is the same with gooseberries and cherries. If such fruit as Mr. Jones's were placed on the market here, it would be strange if prices equal to or higher than are obtained in the South could not be realised in our local markets.

INVESTIGATIONS ON PAPAYA.

Although the papaw has for many years been grown in Queensland on the coast from South to North, and that with very good results, there are still problems to be solved in connection mainly with the treating of male and female and "andromonœceous" plants—*i.e.*, plants with male and perfect flowers on the same trees; also with the formation of branches by the removal of tops to avoid damage to tall trees by high winds, and to facilitate the gathering of fruits without damage. Another point is, how to produce large fruits. All growers of papaws know that in some varieties the fruits are densely packed, and thus they interfere seriously with each other's growth.

The "Agricultural Journal of India" (October, 1914) published a most useful paper on these and other matters connected with the cultivation of the papaw, which we take from that journal in the interests of Queensland growers.

A point not touched on by the author is the packing of the fruit for transport.

We received last month from Mr. E. T. Edwards, of Marmor, North Coast Line, who has been most successful in producing large fruits, a case of papaws which had been six days packed before its receipt in Brisbane. The fruit was packed in paper, each fruit separately, and the vacant spaces filled with paper. There were over twenty fruits in the case, and all were ripe, but, notwithstanding the knocking about they probably received in the course of transit, not a single fruit was even bruised, and the packing-paper was perfectly dry. This by the way.

The following is the paper above-mentioned, and emanates from the Bombay Agricultural Department, the author, Mr. L. B. Kulkarni, L.Ag. The illustrations showing the advantage of thinning out the closely-packed fruits and artificial branching are from the same source:—

"*Carica Papaya* (the Papaw).—This well-known tree has been subjected to ill-merited abuse, described as ugly and everything that is disagreeable, yet it may be questioned if there is a more handsome or generally useful tree in Indian gardens."—Woodrow.

PROPAGATION.

Cuttings.—The only method by which the papaya has so far been propagated is from seeds. Experiments made in the Ganeshkhind Botanical Gardens, Poona, show that vegetative propagation by cuttings

and by grafting is possible. The first experiments were made with five plants about 1 ft. long, which, after being transplanted in July, 1913, became rotten below ground-level owing to the excessive rains of August. These were uprooted and the rotten portion removed, the upper portions being then planted in a pot and placed in a hot frame. Of these, one struck roots in a month and was transplanted outside, but soon died of exposure. After this about a dozen cuttings from fresh wood were taken, and in January, 1914, were planted in the ground, under shade, and treated as usual along with other cuttings. The result was that the cuttings grew pale and rotted below ground. Another attempt was then made in February, 1914, with two dozen cuttings, each about 1 ft. long and ½ in. thick, taken from one-year-old wood of a country variety. One dozen cuttings in pots were placed in hot frames and the other dozen in the ground, under shade. This time the treatment was different. Sand only was used both in pots and outside as a substratum for planting the cuttings. Of those outside, five rotted despite the care taken in watering. Those in the hot frame kept in excellent condition, and only one of them died. They produced new leaves in a month, while those in the ground were found to be slower in growth.

Grafting.—In January, 1914, five male plants just flowering were whip-grafted with scions of the andromonœceous type (plants with male and perfect flowers on same trees). The thickness of the scion was equal to that of the stock—*i.e.*, half an inch. Three of these died, and the other two produced new leaves in a month and remained healthy until April, 1914, when one was attacked by insects and the leaves eaten, this graft succumbing in consequence. The second one is now in good condition, with new green leaves. The importance of these results lies chiefly in the fact that it may be possible by using these vegetative means of reproduction to settle conclusively some of the questions regarding the inheritance of sex in the papayas. It is doubtful as yet whether they will be of any special value in the practical cultivation of the plant.

BRANCHING OF PAPAYA.

Papaya has a supple, thin, straight trunk branching only when its growth is interfered with. When cultivated it attains the height of from 12 to 20 ft. On account of its considerable height difficulties arise in watching and gathering the fruit. The stems are also easily damaged by wind.

To remove these difficulties, experiments were made in the Ganeshkhind Botanical Gardens, Poona, to encourage branching by the removal of tops of the stems about the time of flowering. Accordingly, ten plants were selected in August, 1910, and the tops of five removed to encourage branching. In a fortnight five to six shoots were produced below the wound, only two being encouraged in each case. Fruits were harvested from December, 1912, to the end of March, 1914. No fruits

were obtained from July to December, 1913. The following table shows the outturn of fruits in branched and unbranched plants:—

Branched.			Unbranched.		
Plant.	Number of Fruits.	Average Weight in oz. of each Fruit.	Plant.	Number of Fruits.	Average Weight in oz. of each Fruit.
1	45	56·8	1 ..	19	33·0
2	32	42·0	2 ..	16	28·2
3	30	26·6	3 ..	21	33·7
4	61	45·9	4 ..	31	58·7
5	23	32·0	5 ..	28	66·2
..	Total .. 191	203·3	..	115	219·8
	Average 38.2	40·65	..	23·0	43·96

The above table shows that the branched plants gave a greater average number of fruits which were of slightly less average weight. It was observed that the branched plants were less frequently damaged by winds, and the fruit was easy to watch and to harvest. In these circumstances it may be said that the system of branching, if done carefully so as to admit air and light and at the same time to break the force of the wind, will prove most beneficial. In June, 1913, one more plant was operated on with special care. In this case four branches were encouraged—one to each point of the compass. The fruits on each branch were uniform in size and shape and also bigger than the average fruit of other plants. (*See* Fig. 2, Plate 2, page 37, January issue.)

It may be noted, in passing, that Mr. F. B. Kilmer, in his article on "The Story of Papaya,"* states that removing the top of the plant and thereby encouraging more branches and fruit is much more beneficial in cold climates, since the plant is protected from frost, and fruit is produced near the ground.

It is also mentioned, in "Hawaii Agricultural Experiment Station Report for 1911," page 30, that, to get large-sized fruits, it is best to prune off the branches when they first appear.

THINNING OF PAPAYA FRUITS.

The fruits of the papaya are borne round the stem in such a way that they interfere seriously with each other's growth. It is therefore best to remove a certain number of fruits to allow the rest to develop better.

With this end in view, ten plants in the Ganeshkhind Gardens, Poona, were operated on in September, 1910, one unthinned plant being left for control. The process caused much greater development of the individual fruits. (*See* Fig. 2, Plate 2, page 37, January issue), one being as heavy as 8 lb., and the remainder ranging from 6 to 8 lb. A

* "Jamaica Agricultural Department Bulletin," Vol. I., Part 8.

dealer offered 4 annas each for the thinned fruits. The unthinned tree had many fruits which had crowded and deformed one another. A similar experiment was tried under the writer's advice in a cultivator's field, and the results were equally satisfactory.

In 1912 the experiment was again systematically conducted in the Ganeshkhind Gardens, Poona, twenty plants being selected and labelled "A" and "B." The ten plants labelled "A" were thinned, and the ten plants labelled "B" were left unthinned as controls. The variety used was Ceylon. The following table will show that the average number of fruits from the thinned plants is much less than that of the unthinned, but the average weight is correspondingly greater. The estimate of the money value is based on a small number of fruits only which, when sent to the market, brought the following prices:—

Thinned.		Unthinned.		Remarks.
Number of Fruits.	Price.	Number of Fruits.	Price.	
	Rs. As. P.		Rs. As. P.	
4	0 5 0	3	0 2 9	
6	0 3 6	16	0 13 0	
...	...	5	0 3 0	
10	0 8 6	24	1 2 9	
The average price per fruit comes to 10·2 pies.		The average price per fruit is 9·3 pies.		

A.—Thinned.				B.—Unthinned.		
Plants.	Number of Fruits Removed.	Fruits Obtained.	Average Weight of each Fruit in oz.	Plant.	Fruits Obtained.	Average Weight in oz.
1	12	6	39·3	1 ...	20	37·2
2	15	11	34·0	2 ...	23	31·5
3	16	7	48·2	3 ...	11	30·5
4	16	8	54·0	4 ...	15	35·8
5	23	9	47·7	5 ...	14	36·1
6	10	7	43·0	6 ...	14	38·7
7	11	6	36·8	7 ...	15	36·4
8	7	1	27·0	8 ...	28	26·9
9	5	4	42·0	9 ...	11	30·8
10	13	10	37·7	10 ...	11	24·3
Average ...	12·8	6·9	40·9	...	16·2	32·8

The above results show that the increase of weight is not sufficient to compensate for the loss of fruits in the experiment under consideration. Another experiment gave the following results:—

Plant.	Fruits Removed.	Fruits Obtained.	Weight.
1	5	3	71·6 oz.
2	6	7	65·0 ,,
3	7	3	52·3 ,,

Here the weights are greater but the fruits still fewer.

With a small number of, say, six good fruits per plant the experiment may pay ultimately when run on a large scale, *vide* the "Annual Report of the Government Horticultural Gardens, Lucknow, for 1912," where it is stated that an acre of land carrying 1,000 plants, each producing six to ten fruits after thinning, may give considerable profit to the grower. The difficulty is to hit on exactly the right amount of thinning to get the greatest weight compatible with the greatest number of fruits. This can only be obtained by practice, and in the meantime it is recommended to remove only such fruits as are obviously going to be badly crushed.

ORANGE-GROWING IN NORTH QUEENSLAND.

By G. WILLIAMS, Fruit Inspector, Cairns.

The orange (also including mandarin) was originally looked upon as best suited to sub-tropical conditions, but where grown under purely tropical influences it is found that neither vigour nor productiveness are impaired, but very much increased. The general quality of the fruit, except where subject to the influences of excess of moisture, is also decidedly improved. The Northern climate, from Townsville to Cooktown, embraces a wide range of conditions varying from excess of moisture to almost the other extreme, the most humid being included in coastal area from Mourilyan to Port Douglas. Rapid development of the tree is characteristic throughout, but a warm, dry atmosphere being essential to maturing fruit of the best quality, as this is departed from the tendency is toward a "watery" fruit without the keeping qualities of those matured under drier conditions. This is to some extent compensated by fruit in humid districts maturing early in the season and thus commanding ready sale. Under drier influences the crop is very late, extending with ordinary varieties in the Cook district to early November, and when late Valencias come into bearing will probably be extended to late December. The possibilities of orange growing in districts where the fruit matures at this time of year, and also where the injury from scale insects is practically nil once the trees have become established, can readily be appreciated.

It is common belief that orange trees are but short lived, no doubt attributable to planting those worked on inferior stocks or in unsuitable soil. Probably the oldest-worked trees in North are in the vicinity of Cooktown, being upwards of 40 years old, vigorous and productive, with every appearance of continuing to remain so. According to recognised authorities, the orange tribe live to a very great age in a soil and climate that suits them. An orange tree at the convent of St. Sabina, at Rome, was said to be 600 years old. At Nice there was, according to Risso, a tree which generally bore between 5,000 and 6,000 oranges, being quite 50 ft. high with a trunk which required two men to embrace it. The largest tree measured by Mr. Wallace in the Azores was 30 ft. high, the stem being 7 ft. in circumference at the base.

A varying number of trees have in previous years been planted throughout the North, but principally on account of the reasons before mentioned, also inattention, except in odd instances, have not been entirely successful. That previous failures be not repeated careful attention must be given to the following details:—Plant in suitable soil and situation only approved varieties worked on reliable stocks (orange on seedling orange or pomelow, mandarin on seedling mandarin, other than thorny variety), systematically arranged to admit of economic working and least possible hand labour. Maintain vigour by efficient cultivation and irrigation where necessary; and spraying or cyaniding to eradicate on first appearance any trace of disease.

Suitable soil.—A free loam of good depth will give best results. In this natural drainage is provided and the constituency best adapted for the maintenance of indispensible regular and even supply of moisture, without which orange growing is more or less a failure. The greater the depth the better will the trees withstand seasons of drought. When overlying an impervious subsoil, drainage is defective and trees are but short-lived, and where subsoil is of a coarse, gravelly nature fertility is lacking. In the absence of essential soil conditions, the trees may remain productive for some years, but the quality of fruit gradually becomes impaired—diminishing in size and containing excess of " rag." Gumming appears amongst the branches, and during the remainder of life the value of crop annually diminishes. Though the orange in suitable soil is a hardy tree, there is no profit attendant upon its cultivation where subject to any kind of hardship, therefore upon the selection of a suitable site for planting ultimate success or failure are almost entirely based.

Land preparation.—The most important feature in preparing forest land subsequent to clearing is deep cultivation. Newly cleared scrub land does not admit of general cultivation, but in all cases the soil should be deeply worked beyond the radius to which roots may be expected to extend during the year, and annually increased to meet further requirements. Extra expenditure in this direction will be amply repaid in after growth. Explosives are being largely used for loosening the soil and considered both effective and economical. Shooting by dynamite at a depth from 3 ft. to 5 ft. has a shattering effect for several feet lower and for a corresponding extent sidewise. For loosening the soil throughout an old orchard this is undoubtedly the most effective method, provided the ground has been thoroughly tilled, all roots of perennial weeds, such as couch grass, thoroughly eradicated, and the ground levelled as far as possible or reduced to an even surface, laying off must be considered. For convenience in cultivation, also for the beauty of the orchard, trees should be in straight lines, a measuring wire being most convenient for the purpose. The general practice is to plant in squares, the trees being all at right angles. This is the simplest arrangement and generally held to be the best. Where the land has been properly worked, the holes for the reception of young trees need only be large enough to contain their roots without folding or in

any way cramping them. The suggestion that holes can be dug at any time after laying off the land though it is not desired to plant immediately is not recommended—soil that requires treatment in this manner is best left alone or utilised for some other purpose. In digging holes place the surface soil on one side, and the lower soil on another. The object is to have the top soil to place in direct contact with the roots when the tree is planted; the lower soil being used to complete the refilling.

The distance which should be allowed between trees may vary slightly according to varieties, and also to immediate local conditions, but as a general rule this should not be less than 24 ft. By systematic shortening they may be kept within slightly less limits, but it will be found that the return for a given area will be much in favour of the larger, though fewer, trees. The effect of dry spells is also a consideration, and very noticeable where there is any suspicion of overcrowding. Orange trees, having practically no dormant season, require a much greater amount of moisture than the generality of fruit trees, and where the supply is curtailed the effect is soon manifest upon the foliage.

Varieties.—The selection of varieties for planting will depend on local circumstances, also market requirements. Cardwell, Port Douglas, and Cooktown, where late fruit is the object, planting should be mainly confined to late Valencia orange. Where early crops are matured, Washington navel and White Seletta orange, with Emperor mandarin, should have most attention. Some of the more recent varieties of mandarin, possessing a very thin rind, have not been an unqualified success (particularly when on lemon roots) in the more humid parts, but in the drier coast lands they should do well. In tableland districts best fruit of these will no doubt be produced. The threadbare question of seedlings *versus* grafts intrudes in respect of varieties, and the former will always have its advocates. On account of the whole energies of the seedling being devoted for some years (at Naples a seedling was 26 years old before commencing to bloom, and 20 years have been noted in Queensland) to wood production, whilst those of worked trees are largely toward reproduction, the former is less susceptible to hardship in earlier stages. Worked trees are referred to as shorter lived than seedlings—attributable mainly to inattention, and being worked on inferior stock. The influences of stock and scion are apparent equally in the orange as in other trees, a very close analogy being indispensable where a regular and permanent growth is desired. Extremes can be illustrated by working an orange on both thorny mandarin and rough lemon. The medium will be found when a seedling orange is worked. Many opportunities have been availed of for comparison of worked trees, grown under precisely similar conditions in different parts of the North, and in every instance where planting has exceeded twelve years (in many cases much less), the disadvantage is very plainly with the lemon and citron stock. A disadvantage frequently applicable to seedling trees is irregularity in cropping compared with worked varieties.

The season or time of planting when trees are only procurable from Southern nurseries is confined to colder months. For Northern planting this is a drawback, being followed by the drier parts of the year, and growth, instead of being stimulated, is more likely to become stunted. Locally-grown trees are best transplanted on approach of wet season, when everything is favourable to their becoming established before advent of dry conditions. In the absence of Northern supplies, it is thus an advantage for planters as far as possible to grow their own young trees. Seeds planted closely in shallow boxes about 6 in. deep and filled with fine soil to within an inch of the top will develop plants 3 or 4 in. high in a few months. These can be planted in rows 3 ft. apart with 6 in. between plants and by July will be sufficiently advanced for grafting, which, if successful, will admit of young trees being planted in permanent positions if so desired during the following February. Grafting is recommended for the amateur in preference to budding, though the latter has the advantage of being applicable at different times of the year.

Planting and training.—On no account plant below the level of surrounding surface or so that the original ground level of tree will sink below that plane. It is very much preferable to err on the other side, the roots will extend downwards where necessary, but the base of stem is a fixture and will remain where placed unless forcibly moved. Nursery stock is not unfrequently trained to a long bare stem terminating in a bunch of small branches. Such samples should be cut back to within 18 in. or less of the ground level—in fact, all trees other than those reared in pots should be well shortened at planting, four or five shoots which are to form the main branches being allowed to start at regular intervals. A little extra attention in the early stage and first two years' growth will, by the removal of surplus and misplaced shoots, not only remove the necessity of later amputation of larger branches, but by directing the growth into permanent channels assist in the earlier development of the tree. No hard-and-fast rules can be followed for pruning young trees, but misplaced shoots should be removed in earliest stages by a sharp knife and cut close in to the base, thus removing any adventitious buds which the practice of rubbing off with finger and thumb allows to remain to become a perpetual source of trouble, and the formation of unsightly callus. The orange being exceedingly susceptible to injury by exposure of its roots, for this reason the handling of young trees must be such as to allow a minimum of exposure. They should not be allowed to become dry under any conditions, and the application of water at planting should be as soon after insertion as possible.

As growth progresses, attention to early training should result in an evenly balanced tree, well developed but not crowded, though some attention to shortening long flexible shoots or such as have a tendency to excessive vigour may be necessary. The Emperor mandarin has a habit of producing long upright shoots, whilst a vigorous Washington navel when untrained adopts a weeping habit. To counteract both influences, shortening is the only effective system. If allowed to grow

unchecked, the slender branches of mandarin cannot support the weight of fruit, and are either bent into unsightly shape or broken at the forks in consequence. The navel will have branches bearing upon each other, the lower ones trailing upon the ground. In no case should trees be trained with long bare stems, nor with extremities of lower branches at a great distance from the ground. In addition to the advantages of collecting the fruit, spraying, &c., a low-set tree affords a shade for the ground and, what is of much importance in a hot climate, protects the stem from direct rays of sun. Trees so trained are much less liable to injury by heavy winds.

Cultivation.—That an efficient state of cultivation should be maintained amongst trees is generally admitted, but the perceptions of actual requirements vary from the requisite to the extreme of indifference. To maintain the land free from weeds throughout the year is in many places impracticable, but there is no occasion to allow perennial weeds, of which couch grass is here the most persistent, to obtain a footing, much less to assume control.

Some diversity of opinion exists in regard to the necessity of or frequency for ploughing between the trees. In districts where rainfall is fairly continuous during the wet season, ploughing is indispensable, and the most satisfactory method of disposing of the crop of annual weeds which appears at this time. The frequent use of disc cultivator will dispense of much of the necessity at other periods, for it must be recognised that one of the most active agencies for the exhaustion of moisture from the subsoil is the growth of weeds. Although under cover of rank vegetation moisture may appear at the surface, and convey the impression of conserving it in the soil, while the moisture in the lower layers is reduced and the trees robbed of their supply. Consequently weed growth should be resolutely suppressed throughout the dry months. The cultivator is also the most useful implement for maintaining the surface soil in the best possible condition, it being essential to maintain a disturbed layer of loose earth over the entire surface, the pulverisation of which must be so complete that capilliarity is destroyed. In a hot climate at least 5 in. to 6 in. is not by any means excessive. If but roughly broken up in the form of coarse clods the air has free access to the upper surface of soil beneath them and evaporation proceeds, though in a somewhat less degree, as if cultivation were absent.

Manuring.—To apply heavy dressings of manure about young trees, particularly at the time of planting, is decidedly more harmful than beneficial. After the trees have become established and commenced to bear, systematic fertilising becomes necessary. Overmanuring, particularly with organic substances, has practically the same effect as excessive moisture either by natural agency or irrigation. In this case the absorption appears to be too great for the transpiration, and the heavier the nature of soil the more will ill effects be shown by the tree.

Renovation of an orchard in which cultivation and attention has been neglected is an unpleasant task, but unfortunately there is ample

scope for practice. Parasitic growths, decay, and not infrequently disease are often present. To commence operations by merely working the land and eradicating weeds would be very slow in effect. Trees so situated should be severely headed back by at least two-thirds of the length of branches, all diseased and decayed parts being cut clean away; in fact, nothing but the stumps of main branches remaining as a base for the formation of a new head. The land thoroughly worked, preferably with disc implement. Surface roots will be destroyed by this means, which is rather desirable, as they only serve to keep the tree supplied with nutriment during wet weather, and for a short subsequent time. The foliage being removed relieves the principal strain, and aided by cultivation both root and branch growth are stimulated, and with the loss of but a season's crop of inferior fruit new life is infused throughout—judicious thinning of young shoots will be necessary—preferably after the first growth—far more will appear than space can permit to develop. Where trees have been planted too closely and have exceeded the allotted space shortening the branches in a more moderate degree should be annually practised. Developed trees which for any reason may be classed as inferior or unprofitable can be transformed into desirable kinds by budding over—a much more expeditious method than replanting. The usual practice, also the most reliable, is to severely head back the tree whilst dormant, as recommended in dealing with neglected orchards, thus forcing out new shoots which are thinned out as they appear, leaving only such as required to form a shapely tree when budded. The system of inserting buds beneath the bark on old branches is adaptable to moderately young trees, but where they are of large size, with thick branches, results are not nearly so satisfactory as with the previous method, though having the advantage of time in the process of recovery.

Diseases.—Northern part of the State is no freer in assortment of injurious pests than other parts, but in respect of scale insects the coastal orchards have generally little or nothing to complain of. In several districts, where either spraying or cyaniding are totally unknown, fruit is marketed in appearance as clean as from the best appointed orchard, due entirely to the agency of parasitic fungi destoying the scale on both tree and fruit before the latter reaches maturity. In others but an occasional application is necessary to keep these pests in subjection. The innumerable presence on new growth of young trees of black aphis is sometimes a source of trouble, detrimentally affecting the growth where allowed to remain unchecked. The various diseases and remedies applicable are detailed in pamphlet, "Destruction of Fruit and Vegetable Pests."

The most serious fungoid pests are those responsible for the "black spot" of fruit so prevalent in Cardwell district, and the widely distributed gumming or die-back of branches, and not infrequently the whole tree. Spraying with Bordeaux mixture has been recommended as a preventive against the former, but better results can be anticipated from Burgundy mixture, on account of its being more adhesive. Similar

applications are credited with influence against the malady of die-back, but extended observations carry the conviction that a suitable soil of consistency not subject to extremes of drought and moisture, efficient cultivation, cover all the preventive requirements.

Interculture.—Undoubtedly a handicap militating against the rapid extension of planting is the length of time which must elapse before an orchard is self-supporting. This under favourable conditions may be put down at about five years. To reduce the strain on finances during that term, interculture is resorted to, dwarf growing crops being grown amongst, but not within reach of roots of young trees, until the latter attain a profitable stage. The system has its advantages, also disadvantages, but the fact of a margin being available after paying for cultivation and keeping the land clean outweighs any other consideration. Various crops are adapted for the purpose, and none of tall growing habits such as maize should be included. Peanuts, potatoes, and other crops which remain but a short time in the ground are preferable, though even pineapples may be grown to advantage. It stands to reason that the fertility so absorbed from the soil must be artificially restored.

A common error has been to plant a larger area than can conveniently be looked after, consequently being all round unsatisfactory. The vigour of trees is affected and the quality of fruit far short of what it should be. The same expense is incurred in gathering, casing, freight, and incidental charges, fruit of inferior quality as where the best only is produced. It will be admitted that growing second grade or inferior fruit is unprofitable. The amount of labour and attention required for five acres of trees will vary slightly in different districts, but in any case a similar occupation of time, necessary for a given area, when applied to double the extent will reduce the returns upwards of 50 per cent. A reasonable extent of orchard, well worked and cared for, is a source of pleasure as well as profit to the owner, but where more is included than can well be managed these phases are apt to entirely disappear.

A CHEAP WHITEWASH.

The Department of Agriculture of New South Wales recommends the following as a cheap whitewash which will stand the rain and weather without coming off, and will do for galvanised iron:—Place enough tallow required for the purpose in a large bucket, then lay about the same quantity of good lime (dry) on top of the tallow—*i.e.*, equal proportions of each; then pour enough water on to slake the lime. When the heat from the lime has melted the tallow, and all is well dissolved, stir it thoroughly until all is well mixed; then apply (warm, if possible) with a large brush. This will do for any surface. The surface must be quite dry before applying the mixture. If required to dry very white, add a small quantity of blue.

Tropical Industries.

NOTES ON TOBACCO CULTURE—No. 2.

By NICHOLAS SACHOULIS, Turkish Cigarette Tobacco Grower and Expert, Inglewood.

TOPPING.

When the tobacco plants come to maturity and the proper number of leaves can be secured, do not wait for the bloom.

Topping is a matter of judgment, and the number of leaves left varies with each plant, and is determined by the vigour of the plants, the character of the season, and the purpose for which the crop is being grown. If too many leaves are left, they will be coarse. Err in the direction of leaving too many. Additional leaves can be removed later if necessary. Late rain and new growth often render plants coarse that otherwise were correctly topped. Leave from twelve to fourteen leaves on the plants when the soil and season are good.

PRIMING.

That is, taking off the bottom leaves. This can be done at the same time as topping is being performed. Three to four leaves should be taken off, as well as all leaves that are damaged. This gives the remaining leaves the full benefit of plant life.

SUCKERING.

Remove all suckers and sprouts as often as they appear. These should not be allowed to remain on the plants, but must be broken off as soon as they are from 2 to 4 in. long. If they are not removed they will rob the leaves of their strength, and thin, gumless, papery leaves will be the result. The plants should be gone over two or three times during the ripening season, as both the maturity of the plant and the texture of the leaf depend upon this suckering being well and faithfully done. The above is necessary in order to have the field ripen evenly, and also to get a good quality and quantity.

PREPARATION.

Have knives, sticks, poles, twine, needles, barns, and labour well in advance of the season. An important matter for the tobacco-grower is not to overcrop himself, and to know that twelve or fourteen leaves give more pounds and a better product, with less labour. Neglect in this particular means badly handled tobacco and loss of time and money.

CAUTION.

Do not cling too closely to any particular practice. Methods must vary with the season and condition, but the methods must be based on the principles underlying the growth of the tobacco plant and the production of good tobacco. Unless you know what is required, and what

any particular method will accomplish, you are working in the dark. If tobacco could be grown anywhere and everywhere, it would have no value. A business that gives so good a return cannot be left to chance. Do not be misled into thinking that you will achieve a high degree of success from the beginning, for it takes some years to adapt methods to conditions. In a future paper I will deal with harvesting and curing tobacco.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING DECEMBER, 1913 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.	No. of Years' Records.	Dec., 1914.	Dec., 1913.
North Coast.	In.		In.	In.
Atherton	7·19	13	3·86	8·59
Cairns	7·60	27	4·03	10·76
Cardwell	8·78	27	3·58	7·41
Cooktown	6·06	27	6·50	16·56
Herberton	5·29	27	3·67	5·49
Ingham	6·36	22	1·75	7·51
Innisfail	12·39	27	2·78	7·46
Mossman	11·55	5	5·40	19·92
Townsville	5·34	30	4·26	6·72
Central Coast.				
Ayr	3·65	27	2·92	9·18
Bowen	3·75	27	5·61	5·71
Charters Towers ...	3·08	27	4·80	4·44
Mackay	6·69	27	3·44	15·59
Proserpine	7·77	11	7·99	12·30
St. Lawrence ...	3·91	27	4·67	8·09
South Coast.				
Crohamhurst ...	7·08	22	5·77	4·45
Biggenden	5·11	14	1·80	4·81
Bundaberg	4·52	27	2·13	5·22
Brisbane	5·07	63	4·93	2·37
Childers	5·44	19	2·30	3·77
Esk	4·45	27	3·92	3·77
Gayndah	4·06	27	4·17	5·78
Gympie	6·48	27	2·52	3·23
Glasshouse M'tains	7·41	6	7·22	2·82
Kilkivan	4·46	27	1·25	4·55
Maryborough ...	4·40	27	1·89	6·24
South Coast—continued:	In.		In.	In.
Nanango	3·57	27	3·67	3·01
Rockhampton ...	4·39	27	5·07	13·40
Woodford	5·44	27	4·02	3·67
Yandina	6·89	21	4·81	5·22
Darling Downs.				
Dalby	3·23	27	2·80	1·35
Emu Vale	3·19	17	7·38	3·92
Jimbour	3·45	24	2·46	1·73
Miles	2·70	27	0·97	2·73
Stanthorpe ...	3·44	27	3·00	1·57
Toowoomba ...	4·10	27	7·89	1·93
Warwick	3·46	27	3·07	3·70
Maranoa.				
Roma	2·57	25	2·65	2·28
State Farms, &c.				
Gatton College ...	3·18	14	7·66	2·83
Gindie	2·76	13	0·64	5·04
Kamerunga Nurs'y	5·94	23	5·71	13·59
Kairi	...	...	3·65	7·79
Sugar Experiment Station, Mackay	7·92	16	2·47	14·21
Bungeworgorai ...	...	...	2·77	1·67
Warren	...	...	3·77	5·02
Hermitage ...	2·12	7	3·68	4·36

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for December this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

Entomology.

NUT GRASS-DESTROYING COCCID AND ITS MITIGATION.

BY H. TRYON, Government Entomologist and Vegetable Pathologist.

The advocacy of the use of the insect referred to in the June number of the "Queensland Agricultural Journal" for destroying nut-grass is inconsistent with the attitude towards this so-called "Mealy Bug" (*Antonina purpurea*) and its employment in this work already announced in one of my annual reports.

In fact, knowing that all the species of *Antonina*, that have been described, were associated with one or more members of the Grass tribe, that includes such economic plants as sugar-cane, maize, and wheat, and other cereals, I originally suggested that the species now under consideration—*Antonina purpurea australis*—also was, and, until I could ascertain that is was not, refrained from countenancing its dissemination. This attitude was taken apart from question as to its usefulness as a nut-grass destroyer.

Since the time referred to, I have found the insect associated with buffalo grass and with one of our native Gramineæ as well, feeding on both, and so, for the present, I must discountenance the method of coping with nut-grass that involves resort to it.

With regard to locality whence it may be procured, I may mention an estate in the Bundaberg district—a sugar farm in the Woongarra Scrub area, formerly owned by Miss Tanner but lately occupied by Mr. Lane Nott. I would suggest that Mr. Oelrich's latter query be submitted to the Director of the Botanic Gardens. The success there in coping with nut-grass is a matter of common knowledge.

THE SUGAR-CANE BUD MOTH.

(*LOXOSTOMA* SP., FAM. TINEIDAE.)

BY EDMUND JARVIS, Entomologist.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following article on the Sugar-cane Bud Moth from Mr. E. Jarvis, Acting Entomologist to the Bureau:—

INTRODUCTORY.

Although of little economic importance, this insect occasionally proves injurious to seed cane, the caterpillars sometimes destroying as much as 80 per cent. of eyes in soft varieties like "Clark's Seedling" (H.Q. 426).

In addition to direct injuries of this nature they feed on the leaf-sheath, gnaw the surface of the rind close to buds, and frequently bore

into cane stalks, thus producing various wounds that court invasion from fungus diseases.

Owing to secluded habits and the insignificant size of both larva and adult a moderate infestation may easily remain unnoticed in the field, especially when affecting varieties of hard cane. "Badila" is freely attacked at Gordonvale, but injuries appear to be confined principally to the epidermis of the rind in the immediate vicinity of nodes, and to softer basal portions of the leaf-sheath and arrow.

The insect responsible for this damage belongs to the family Tineidæ and is related to our common clothes moths. I am indebted to Dr. A. J. Turner, of Brisbane, for its identification as a species of the genus Loxostoma. He is inclined to think that it may have been previously described as an exotic moth.

It is probably related to *Ereunetis flavistriata,* Wlsm., which is said to occur quite numerously at times throughout Hawaiian canefields, and to occasion a good deal of loss by destroying the buds of soft varieties desired for cuttings.

A species of Tineidæ is recorded also from Porto Rico attacking the eyes and bases of young cane shoots, thereby affecting the stand of the latter, but is not plentiful, and apparently of local occurrence.

LARVA.

Habits.—The caterpillars are usually more or less in evidence during stripping or loading operations, being forced at such times to explore the surface of defoliated canes in search of congenial hiding-places.

Like other species of Tineidæ, they are active when touched, and able to crawl either forward or backward with equal facility.

When thoroughly alarmed the larva wriggles convulsively and seeks safety by dropping into the air suspended on a thread of silk, or as a last resource falls to the ground and hides under débris.

Appearance.—Body translucent; general colour pinkisk-yellow. Head dark reddish-brown with several rather long yellow hairs. Prothoracic segment smooth and shining, pale-yellow shading to brown on posterior half, which constitutes a collar extending nearly to spiracles, and with a darker brown plate on each side on spiracular area forming a continuation of the dorsal collar but separated from it. Meso and metathoracic segments each with 10 large yellowish-brown blotches of unequal size above spiracles, and a narrow transverse blotch between spiracles and legs. Abdominal segments with four small dark spots arranged in subdorsal lines extending the length of body, and four spots on each side grouped around spiracles. Ventral area of first, second, and last three abdominal segments with a transverse row of about 8 smaller spots. The blotches on thoracic segments bear two yellow hairs and abdominal spots a single hair. Anal segment terminated by a light brownish-yellow semicircular patch bearing 8 long yellow hairs. Length of body, 16 mm. (about ⅝ of an inch).

PUPA.

Situation.—Pupation takes place under a silken covering previously spun by the larva and completely hidden under pellets of its excreta ingeniously fastened to the outside. It is usually concealed between the leaf-sheath and cane-stalk and attached near the base of the former or more rarely to rind close to a node. The moth before emerging works the pupa partly out of its cocoon-like covering, leaving half of the broken pupal shell protruding from one end.

Appearance.—Light yellow suffused with reddish on dorsal surface. Abdominal segments each with a transverse ridge near anterior margin surmounted by dark-brown spines. Ventral surface light yellow except on head-end and anal segment, which are clouded with reddish, darkening towards extremities. Legs and antennæ distinctly outlined in light red, the latter meeting centrally on fifth and sixth segments and projecting slightly beyond wings. Top of head prolonged into a somewhat conical cap terminating ventrally in a short sharp spine (*see* Figs. C1 and D). Eyes black. Anal segment provided with two short dark-red curved spines situated dorsally and directed upwards as illustrated in Figs. C2 and E.

NOTE.—The pupa when removed from its case invariably rests with the end of abdomen incurved towards centro-ventral line as depicted in photo at Fig. C2. Length of pupa, 7·80 mm.; length of pupal case, 11 mm. (nearly half an inch).

MOTH.

Description.—Female: Fore-wings ochreous-yellow with an elongate purple blotch at base on costa and a large blotch of same colour on apical margin. Hind-wings pale yellow speckled with gray; fringes light shining yellow. First few joints of antennæ, upper surface of prothorax, and top of head thickly clothed with purple scales, which viewed with an ordinary pocket lens are seen to flash with metallic crimson tints. A sort of comb-like ruff of these beautiful scales occurs in front of the head, and they are scattered also over a portion of the blotches on fore-wings. Abdomen golden shaded with iridescent light green. Hind femora densely covered with long yellow hairs. Wing expanse, 16 mm.; length of body, 6·40 mm. (about 1/4 of an inch).

Habits.—The moth rests by day in a conspicuous position on leaves of sugar-cane, &c., with its wings enfolding the body and antennæ laid flat on the surface, projecting straight in front of its head in parallel lines that appear to emerge from the sides of the thorax, this deception being due to a curious disposition of the large, movable, first antennal joint, which is scape-like and directed obliquely to each side of the head (*see* Fig. G).

It most likely oviposits on the rind between stem and leaf-sheath, a position that affords safe harbour for the future larvæ, which are generally found in this situation during all stages of growth.

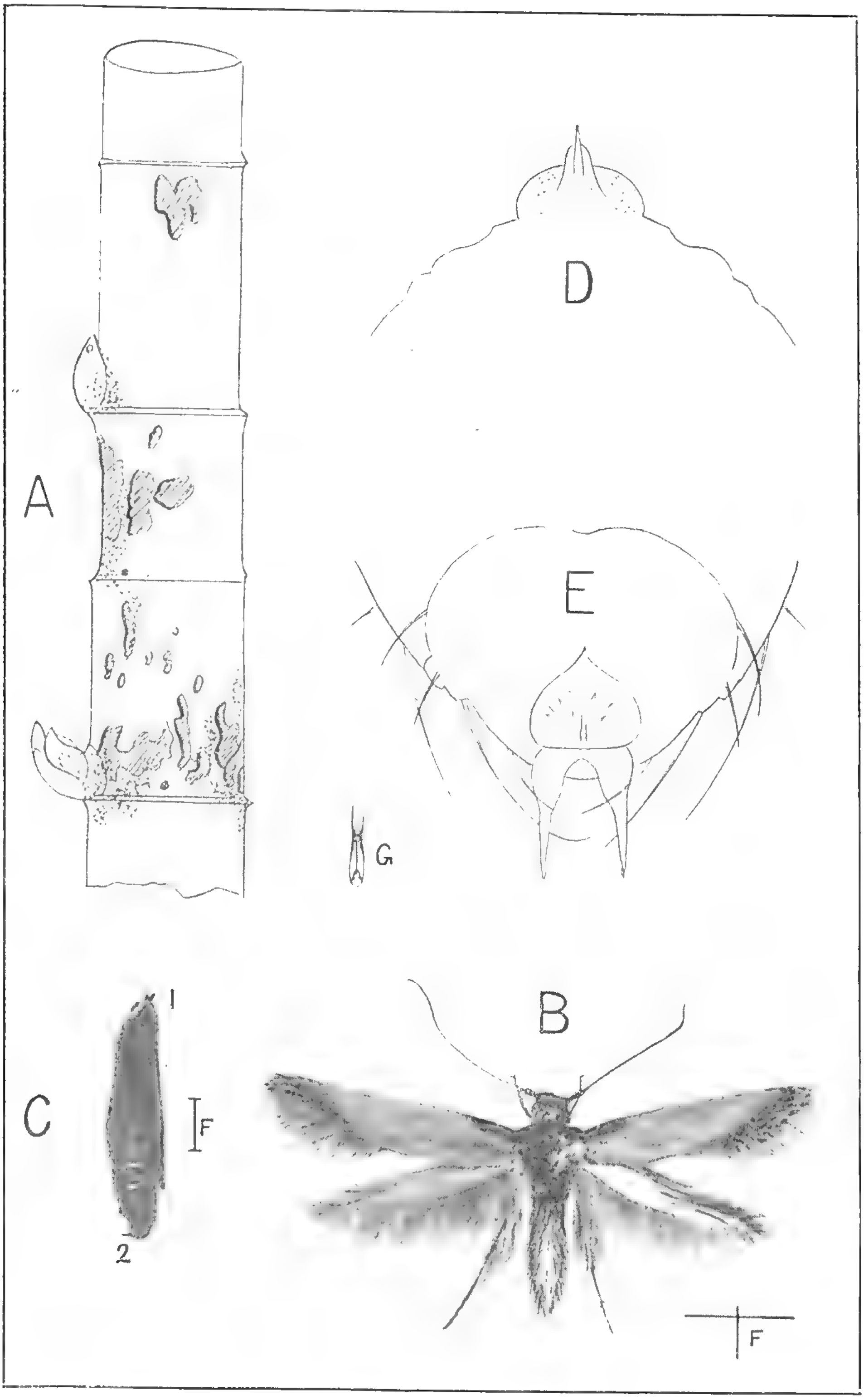


PLATE 4.

A—Diagrammatic sketch of damaged cane-stalk.
B—Bud moth (*Loxostoma* sp.), magnified five times.
C—Pupa of bud moth, magnified five times.
D—Ventral view of head of pupa at C1, highly magnified.
E—Extremity of anal segment at C2, as seen when pupa lies on its back with end of abdomen turned up.
F F G—Natural size.

CONTROL.

Natural Control.—Larvæ of this moth are probably attacked by parasitic hymenoptera, but up to the present none have been bred from the scanty material collected.

A small earwig and two or more brightly coloured cockroaches of arboreal habits occurring plentifully on cane plants are most likely predaceous foes, their flattened form allowing them to easily crawl between the stem and base of leaf-sheath in search of prey. The common English earwig has been observed devouring pupal of a small moth that destroys parsnip seed. I confined specimens of our sugar-cane cockroaches and earwig with bud-moth caterpillars, as a test, and after twenty-four hours found that both insects had eaten the larvæ placed with them. Such results, however, cannot be regarded as conclusive evidence of carnivorous habits until confirmed by further experiments carried out under natural conditions.

Artificial Control.—Fortunately this pest, although evidently widely distributed in Queensland, is of minor importance, and does not call for remedial action unless affecting cane-cuttings of soft varieties intended for seed. It is, of course, desirable to prevent as far as possible the introduction of such infected cane into districts brought under sugar for the first time.

Cuttings of choice varieties grown exclusively for seed should be immersed in Bordeaux mixture solution for one hour before being planted, to ensure destruction of any larvæ that might be present and minimise chances of injury from cane fungi.

This method of disinfection is not only simple and inexpensive, but, in addition to its insecticidal and fungicidal value, has been found to promote better germination and also increase the final yield.

Whilst experimenting last December in connection with the control of scarabæid cane-beetles I was pleased to find that artificial light had an attraction for this moth.

Burning trash as soon as practicable is to some extent a controlling factor, as pupation occurs mostly on the leaf-sheath; moreover, large numbers of the moths would be unable to escape from the suffocating smoke of a big fire.

Avoid growing bananas close to sugar-cane, as the former happens to be a favourite food-plant, its succulent leaf-stalks affording a superabundance of nourishment to larvæ of this pest.

General Notes.

WAR AND WOOD PULP.

On the serious question of the world's paper supply, the "Times Literary Supplement" says:—

"It is not only in its effect upon the reading public that the war is keeping the book trade in its present state of suspended animation. The question of the paper supply is obviously a very serious one, when so much of the raw material for books comes from abroad in the shape of wood pulp and esparto. Esparto, a grass from the shores of Spain and Northern Africa, preceded wood as a substitute for rag when the supply of that material proved insufficient to meet the increasing needs of the book market. To-day, some 100,000 tons of esparto are imported into England, chiefly for this purpose, esparto being especially to the manufacture of book paper. The war will cause the paper-maker to turn his attention more closely than ever to the discovery of other sources of supply. Wood is not an inexhaustible material. The demand for pulp has increased so vastly that it is now estimated to account for the destruction of something like 50,000,000 trees every year. According to Mr. R. W. Sindall, who has made investigations in this connection on behalf of the Indian Government, the more likely substitute for esparto grass and wood pulp is bamboo; but experiments are being made with fibrous stock of every description. Meantime, the price of paper has gone up, and one of the largest manufacturers of the book trade recently stated that, unless fresh supplies of material and chemicals were forthcoming, his works would be temporarily shut down before the end of the month. The increase in the price of paper in the book world will naturally fall heaviest of all upon the cheap reprints, especially when these are issued by British houses for Continental editions."

The "South African Mining Journal" of 12th September, 1914, in an article on "Paper-making in South Africa," states that a certain grass called "Tambuti" or "Tambookie" (*Cympogon validus*) grows in great profusion in Natal, the low veldt of the Transvaal, and other parts of the Union, and the idea of utilising this grass for the purpose of paper-making is no new one. The possibilities of that question have often been speculated on, but nothing definite has hitherto been arrived at. A sample of tambuti grass was recently submitted to the Department of Customs and Excise, at the Imperial Institute, and the report which has just been received is distinctly encouraging.

The sample of grass weighed 12 lb., and consisted of lengths up to about 5 ft. 6 in.; the stems measured about one-sixth inch in diameter at the base. A chemical examination of the grass gave the following results, and the corresponding figures for Algerian esparto grass (which

is at present largely used in paper-making) are included for the purpose of comparison:—

	Tambuti Grass. Per Cent.	Esparto Grass. Per Cent.
Moisture (on drying at 100°–110° C.)	10·2	8·8
Ash (expressed on dry material)	7·4	3·0
Yield of unbleached pulp (dried at 100°–110° C.)—		
(1) Expressed on material (air dry material) ..	37·1	29·5
(2) Expressed on material (dried at 100°–110° C.)	41·3	32·3
Loss on weight of pulp on bleaching	3·1	1·3
Yield of bleached pulp (dried at 100°–110° C.) expressed on original material dried at 100°–110° C.	40·0	32·0
Length of ultimate fibres in inches	0·012 to 0·188 0·081	0·012 to 0·12 0·045

The report says that, on heating with caustic soda solution under pressure, the tambuti grass was readily converted into a light fawn coloured pulp, which was very easily bleached to a pure white product. It will be noticed that the yield of pulp is unusually high, whilst the average length of the ultimate fibres is considerably greater than in the case of the esparto grass. Paper-making trials carried out at the Imperial Institute showed that a satisfactory paper of fairly good strength could be prepared from the tambuti pulp, and specimens of both the bleached and unbleached product have been received by the Department of Customs and Excise. The report concludes—"The high yield of pulp of good quality, and the ease with which the pulp is bleached, show that the tambuti grass is well adapted for paper-making, and the crude material would probably be worth about £4 per ton in the United Kingdom. It would, however, probably be more remunerative to convert the grass into 'half-stuff' in South Africa, and either ship this 'half-stuff' to Europe or utilise it locally for the manufacture of paper."

KILLING DESTRUCTIVE BIRDS.

OPERATIONS IN NEW SOUTH WALES—EFFECTIVE POISONING.

The real seriousness of the parrot pest in New South Wales is now realised, and the time has arrived when some very decisive move must be made by fruitgrowers to cope with it. Too many growers have had the heart-breaking experience of seeing all the good work put into their orchards in pruning, spraying, and cultivating go for nothing, save to feed hungry droves of parrots, which, in a few weeks, either ate out or rendered the harvest unfit for market.

The birds are much too cunning to be long put off by the old-fashioned scarecrows, and in a few days will so far overcome their first fears as to alight upon the very apparition itself. Shooting, either with shot guns or pea rifles, has proved inadequate and far too costly, consequently attention has been turned to poisoning as the ultimate solution of the problem. Amongst those who have achieved success in dealing with the pest is Mr. Philip Sommerlad, of Spring Valley, Tenterfield (an enthusiastic reader of "The Fruit World"), and his well-thought-out methods have been followed by such conspicuously good results that

the facts deserve to be made known. Mr. Sommerlad has for many years favoured strychnine poisoning as the most effective remedy, and during the past season showed conclusively enough that if growers could be induced to take united action the pest could be wiped out at a trifling cost.

His method of working is simple (writes the "Sydney Daily Telegraph"). He makes use of the fact that the birds are essentially gregarious in their habits, and invariably confine their operations to certain picked trees of a variety of apple or pear that suits their taste. As the parrots in question are by nature honey-suckers, and are therefore fitted with a tongue adapted for extracting the sweetness out of fruit or flower, they may be relied upon to select a sweet apple, and upon such a tree or row of trees they will concentrate in hundreds, and, if left undisturbed, will eat the crop out to a finish.

Mr. Sommerlad chooses one or more of the best of such trees—preferably in different parts of the orchard. He first picks the apples, whether sound or partly eaten. He then takes a good number—say half a case—of attractive, firm, juicy apples, and, with a packing needle, runs a string through them individually from stem to calyx, leaving a couple of inches protruding at either end. With a pen-knife he makes an incision in the side of the fruit (more than one if the fruit be large), inserting the blade almost to the core, and giving it a turn so as to take out a " plug," a little less than half an inch across. Into the hole thus made a small quantity of powdered strychnine is placed, about as much as will stay on the point of the knife-blade. (A reversed pen-nib will be found to meet the case.) The "plug" is then reinserted, and the apples are allowed to stand for at least twelve hours, by which time the peculiarly solvent juice of the apple has dissolved the strychnine and distributed it throughout the fruit.

To hang the bait in the chosen tree is the next step. For this purpose, nothing is found to answer better than a bough from a bush tree, such as a stringybark, which is then mounted on a pole so as to be well above the foliage of the apple-tree. This is preferable to hanging the fruit on the tree itself, inasmuch as parrots invariably alight on the topmost part of a tree and work downwards. The boughs are also portable, and, should the parrots shift their quarters to another part of the orchard, can easily be removed to the spot. The best plan is to place a number of boughs in different parts of the orchard. It is scarcely necessary to say that every care must be taken to warn persons going into the orchard. Poultry should also be kept at a distance, though little fruit falls from the boughs, on account of its being tied on. All that is now necessary is to place a couple of decoy birds in a cage in the tree, and the parrots can be left to their own devices.

The poison is exceedingly quick in action, and within ten minutes or so from the time they commence to eat the birds will begin to drop. Many fly away as soon as poison pangs seize them, and may be found in all parts of the orchard, as well as in the bush around and in neigh-

bouring orchards. Poisoned birds have been picked up in orchards 5 miles and more away. This fact makes it impossible to compute definitely the extent of the destruction, but enough evidence can be gathered from the known results to show that the method is exceedingly effective.

As the poisoned fruit is eaten, more is put up, and the work may be continued almost indefinitely while the birds continue to give trouble. During the past season, Mr. Sommerlad used poison on 20 days, and 2,571 dead birds were picked up, but this does not indicate by half the number killed. The biggest total for any one day was 430 dead birds.

In addition, the method is found to be very effective for flying foxes, who, like the parrots, alight on the highest point of the tree and work down. Many of these also fly away to die, but Mr. Sommerlad gathered about 200 in his orchard while poisoning was in progress. Tallies of twenty in a night were frequent. The cost of the above work, excluding the value of the fruit used and the small amount of time taken, was 11s. No apparatus of any kind needs to be purchased, the first, last, and only expense being the strychnine itself.

In view of these facts, it is obvious that only concerted action on the part of growers in districts affected is necessary to so diminish the birds that their ravages will be neither here nor there. But while some remain sceptical and others are indifferent, the odd enterprising orchardists in the district are placed at a great disadvantage. By clubbing together and purchasing the necessary strychnine in bulk lots, a great saving could also be effected in the cost of the poison. Mr. Sommerlad's method, which has been arrived at after years of observation and experience, has proved itself cheap and sufficient, and its wholesale adoption could not but be followed by the most satisfactory results to the fruit industry.—" Fruit World."

MANURE FOR LUCERNE.

One hundredweight bonedust, 6 cwt. superphosphate, and 3 cwt. sulphate of potash. This should be applied at the rate of 2 cwt. per acre.

ERRATA.

In the table containing the analysis of the sheep dipped during the dipping experiments at Gindie State Farm, published in the January issue of the Journal, two obvious errors occur. It is made to appear that out of 50 sheep dipped, 81 were fly-blown, and the number on the back and ear is also given at 81. In both cases the numbers should have been 11.

Answers to Correspondents.

PACKING EGGS FOR COLD STORAGE.

If eggs in cold storage are packed in chaff, the latter is likely to "sweat," causing discolouration of the eggs, and giving them a somewhat musty flavour. It would be much better to pack in the ordinary cardboard fillers, but even these are apt to become damp in cold storage.

RHEUMATISM AND KIDNEY DISEASE IN SWINE.

For the treatment of these ailments, the Government Veterinary Surgeon, Mr. McGown, recommends:—

"If rheumatism is the cause of trouble, the animals should be kept warm and dry. Soft, nourishing food with 4 grains of iodide of potassium should be given twice daily. In the case of kidney worms, 2 drachms of oil of turpentine in half a pint of milk will prove beneficial."

BANANA CULTURE.

E.B.C., Gympie—

Mr. C. Ross, Instructor in Fruit Culture, advises that the Cavendish and Ladies' Finger varieties are the most suitable for your locality, but no variety will stand much frost. So far, Gros Michels have not been the success that was anticipated—this or any other variety will not stand six successive frosts. September and October are the best months to plant, although the work may be done all through the summer. Banana suckers might be obtained from any of the Chatsworth banana-growers.

TO GET RID OF BLACK ANTS.

"BLACKFELLOW," Tara—

The best substance for destroying black ants is corrosive sublimate. Carpet rag strings dipped in it and fastened round the blocks will cause them to leave at once. It is said that if a tree or house block be smoothed to a width of about 6 or 7 in., and this space well rubbed with chalk, the ants will be absolutely prevented from climbing. They seem to entirely lose their footing, those below the ring being unable to climb, and those above it falling the instant they set foot on the chalk. The chalk should be removed from time to time.

Other remedies are: Washing with a solution of ammonia, washing with carbolic soap, and pouring gasoline into their nests. Make the following mixture:—White lime (slaked), 6 quarts; kerosene oil, ½ pint; turpentine, 1 wine-glass; soft soap, 5 lb.; cowdung, 3 quarts; water, 16 quarts. With this wash the blocks or trees.

None of these remedies are permanent, but will require repeating often.

DISEASED UDDER.

The affection of the udder, as described by a correspondent, is not infectious, but may be transmitted by inoculation. Therefore, the milker should wash his hands thoroughly before touching another cow. The udder should be well fomented with warm water, and the wounds dressed with powdered boracic acid.

HIP DOWN AND STRINGHALT.

"BUSHMAN"—

Hip down is the result of an accident. When it is first noticed, the animal should be placed in slings and a stiff blister applied to the affected part. Great care should be exercised in keeping the animal quiet and also to keep the sling from rubbing the animal's hide into sores. In such a case as this, it usually takes from six to eight weeks before the bones are thoroughly united.

Stringhalt is a nervous disease for which there is no remedy.

HORSE WITH ENLARGED WITHER.

A correspondent at Gin Gin lately brought under the notice of the Stock Department the case of a horse with a greatly enlarged wither, which, however, he says is not a fistula, since when pierced with a knife to a depth of 2 in. no bleeding occurs.

Mr. A. H. Cory, Chief Veterinary Surgeon, says that, according to the symptoms described, the trouble appears to be a local form of poisoning, probably of the lymphatics, the exact nature of which cannot be stated. He suggests giving the horse 6 drachms of aloes as a ball or in the form of a drench mixed in 1 pint of water. After this has acted, give 2 drachms of potassium iodide once daily for ten or twelve days in a bran mash. Well rub the swollen parts with a solution of iodine once daily; 1 part of tincture of iodine to 4 parts of water.

DEATH OF COWS FROM EATING MUSSEL SHELLS.

Mr. F. G. Collins, stock inspector, Maryborough, having been informed that a cow belonging to a resident of Toogoon had died from some unknown cause, paid the owner a visit and made a *post-mortem* examination of the animal. He found that the first stomach contained a quantity of broken-up mussel shells. As all the organs were healthy, except considerable inflammation of the stomach, he was of opinion that the shell was the cause of death. The want of lime causes cattle to eat shells and bones. The matter being referred to Mr. McGown, Government Veterinary Surgeon, he advised: "As there seems to be a deficiency of lime in the soil, I would advise the following lick for cattle affected:—Bonemeal, 1 lb.; carbonate of iron, 4 oz.; gentian, 4 oz.; common salt, 8 oz.; fenugreek, 4 oz. Mix thoroughly together, and allow 1 tablespoonful with each feed."

COW WITH BLIGHT.

With reference to a question by a correspondent as to the remedy for an eye affection in a cow, Mr. McGown, Government Veterinary Surgeon, says that the animal is suffering from blight, and recommends that the eye be painted twice daily with the following solution:—Sulphate of zinc, 5 gr.; water, 6 oz.

If this treatment has not the desired effect, the following solution should be used as above:—Nitrate of silver, 5 gr.; distilled water, 1 oz.

FILLY WOUNDED BY BARBED WIRE.

The wound in the knee-cap as described should be thoroughly washed with a solution of carbolic acid and water—1 to 20—and afterwards dressed by placing a pad of antiseptic lint over the wound, which should be kept in position by a bandage. When the wound has healed from the bottom, the following powder should be dusted on to the surface:—Powdered boracic acid, 6 parts; iodoform, 1 part. Mr. McGown, Government Veterinary Surgeon, does not think that anything will reduce the thickening of the knee which has taken place, but exercise may prevent any further swelling.

THEORY OF WATER-FINDING.

The only literature we know of on this subject is a small book published in 1892 by B. T. Barton, printer, Farnworth, Lancashire, England. The author was B. Tompkins, who was most successful in finding water in many parts of England. He was, possibly still is, a farmer living on Pipsmore Farm, Chippenham, Wiltshire. It would appear that the faculty of water-finding must be inherited and cannot be acquired. Seeing a diviner at work is the best way of acquiring information. Many people unknown to themselves possess the faculty, and only discover this when instructed by a water-finder.

FEEDING STUD RAMS.

A. J. S., Montrose—

If you have no roughage—that is, pasturage—for your rams, a good ration is made by allowing from 4 to 5 lb. of good oaten or lucerne chaff per diem, with the addition of about 1 lb. of grain (oats, maize, peas, or barley, whichever is most easily obtainable). If the animals have not had access to salt, the addition of about one-quarter of an ounce of salt to the ration will be beneficial. With dry rations such as this, a plentiful supply of good drinking water should be available. With rough pasturage, the chaff may be lessened by one-half, but the grain ration (1 lb.) kept up. The object of feeding rams should be to keep them in good working condition and not allowing them to get too fat. Excessive fatness militates against their value in no small degree.

LUMP ON COW'S JAW.

J. H., Emu Park—

This cow seems to be suffering from actinomycosis. Mr. McGown, Government Veterinary Surgeon, recommends that the lump be painted three times a week with tincture of iodine. Two drachms of iodide of potassium should be given morning and night in a bucket of water.

SCRUB TIMBER FOR FENCE POSTS, &c.

Ironbark and bloodwood (forest timbers) are, of course, the best timbers for the purpose. But some scrub timbers will last a long time and others decay quickly. An excellent preservative for any kind of scrub or other timber is the following:—Mix together, to the consistency of paint, boiled linseed oil and powdered wood charcoal. Apply two coats before fixing in the ground. The results are excellent, the timber so treated being rendered practically indestructible.

EGG-EATING HENS.

F. J. TURNER, Dangarfield, Yeulba—

There are only two remedies for egg-eating. One is, to empty an egg by blowing out the contents. Then, through the larger hole at one end, fill with egg and breadcrumbs and saturate this with spirits of ammonia. The egg-eaters will rush for it, but a single peck is usually enough. Inveterate egg-eaters have been cured by this. If the bird is not a valuable one, fatten it and kill it. If valuable, and the eggs are required for hatching, cut the upper beak with a sharp knife till it is tender and signs of bleeding appear. This will not prevent the bird from picking up its food, and the beak will grow again.

DRYING-OFF A COW.

The usual method of drying-off a dairy cow is to gradually reduce the number of milkings, commencing by milking the animal once daily for a short period, then extending the interval between the times of milking by milking the beast once in two or three days until ultimately the flow of milk has practically ceased. Occasionally there is considerable difficulty in bringing about the required reduction in the column of the flow of milk, particularly when the animal has access to abundant and succulent pastures, and in such cases it is advisable to diminish the supply of food, either by turning the cow out into a scantily grassed enclosure or restricting her to the stockyard for several hours each day. Care must be exercised in drying-off a dairy cow, otherwise, upon freshening, the cow will be found to have one or more of the quarters of her udder permanently damaged, the injury being attributable to turning the beast out into a grazing paddock before the flow of milk was sufficiently reduced.

TREATMENT FOR MAMMITIS IN COWS.

In the case of cows suffering from mammitis, the udder should be fomented morning and night with warm water for an hour at a time, and the following liniment rubbed into the affected part when dry:—Soap liniment and belladonna liniment, equal parts; 1 lb. Epsom salts should be given so as to reduce fever.

WARTS ON YOUNG STOCK.

Warts must be forcibly removed, dressings being of little or no avail. In many cases, the fingers are sufficient to remove them, but in other cases a pair of pincers, or a ligature of cord tied round them, may be essential. After extraction the wounds should be treated daily with some antiseptic, such as lysol, Condy's, &c.

BLIND TEATS.

There are several causes for blind teats, but, provided milk is in the quarter, the teat, or milk duct, must be cleared by passing a milk syphon once or twice daily until the teat is clear. Before using the syphon, it should be placed in boiling water for ten minutes to sterilise it, otherwise dirt and various organisms are introduced by the syphon, which may produce serious consequences.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY, 1915.

Article.		JANUARY. Prices.
Bacon	lb.	8d. to $10\frac{1}{2}$d.
Bran	ton	£9 10s.
Butter	cwt.	118s.
Chaff, Mixed	ton	£5
Chaff, Oaten	"	£6 10s.
Chaff, Lucerne	"	£6
Chaff, Wheaten	"	£6 to £6 5s.
Cheese	lb.	6d. to 7d.
Flour	ton	£13
Hams	lb.	1s. 2d. to 1s. $3\frac{1}{2}$d.
Hay, Oaten (Victorian)	ton	£9 to £9 10s.
Hay, Lucerne (Prime)	"	£5
Honey	lb.	$2\frac{1}{2}$d.
Maize	bush.	4s. 2d to 4s. 3d.
Oats	"	4s. 6d.
Onions	ton	£13 to £14 10s.
Peanuts	lb.	$3\frac{1}{2}$d.
Pollard	ton	£10
Potatoes	"	£12 to £12 10s.
Potatoes (Sweet)	cwt.	2s. 6d. to 3s.
Pumpkins	ton	£2 10s. to £4
Wheat, Milling	bush.	5s. 6d.
Eggs	doz.	$7\frac{1}{2}$d. to 1s. 5d.
Fowls	pair	4s. to 5s. 9d.
Geese	"	7s. to 8s. 6d.
Ducks, English	"	3s. 3d. to 3s. 9d.
Ducks, Muscovy	"	4s. 6d. to 6s. 3d.
Turkeys (Hens)	"	7s. to 9s. 3d.
Turkeys (Gobblers)	"	18s. to 22s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	JANUARY. Prices.
Bananas (Queensland), per case	9s. to 12s.
Bananas (Fiji), per case	18s. to 20s.
Bananas (G.M.), per case	22s. to 24s.
Mandarins (Queensland), per case	...
Mangoes, per case	6s. to 7s.
Oranges (Navel), per case	...
Oranges (Seville), per case	...
Oranges (other), per case	8s. to 13s.
Passion Fruit, per half-case	5s. to 9s.
Papaw Apples, per half-case	7s. to 10s.
Pineapples (Queens), per case	11s. to 15s.
Pineapples (Ripleys), per case	5s. to 8s.
Pineapples (Common), per case	5s. to 8s.
Tomatoes, per quarter-case	3s. to 4s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JANUARY. Prices.
Apples (American), Eating, per case	12s. to 13s.
Apples (Local), per case	4s. to 8s. 6d.
Apples Cooking, per case	4s. to 6s.
Apricots, per quarter-case	3s. to 5s.
Bananas (Cavendish), per dozen	1d. to $1\frac{1}{2}$d.
Bananas (Sugar), per dozen	$1\frac{1}{4}$d. to 2d.
Cape Gooseberries, per quarter-case	...
Cherries, per quarter-case	4s. 6d. to 7s. 6d.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per case	...
Custard Apples, per quarter-case	...
Lemons, per case	6s. to 8s. 6d.
Lemons (Italian), per case	10s. to 15s.
Limes, per case	...
Mandarins, per case	7s. to 8s.
Mangoes, per case	6s. to 7s.
Nectarines, per quarter-case	2s. 6d. to 4s. 6d.
Oranges (Navel), per case	...
Oranges (other), per case	15s. to 20s.
Papaw Apples, per quarter-case	1s. 6d. to 3s.
Passion Fruit, per case	3s. to 5s.
Peaches, per quarter-case	2s. to 5s. 6d.
Peanuts, per pound	$3\frac{1}{2}$d.
Pears, per case	4s. to 8s. 6d.
Persimmons, per quarter-case	...
Pineapples (Ripley), per dozen	5s. to 8s.
Pineapples (Rough), per dozen	1s. to 2s. 6d.
Pineapples (Smooth), per dozen	2s. to 5s.
Plums, per case	2s. to 4s.
Rockmelons, per dozen	7s. to 8s.
Rosellas, per sugar bag	...
Strawberries, per tray	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	1s. to 2s. 6d.
Watermelons, per dozen	4s. to 12s.

TOP PRICES, ENOGGERA YARDS, DECEMBER, 1914.

Animal.	DECEMBER. Prices.
Bullocks	£12 7s. 6d. to £15 15s.
Cows	£9 7s. 6d. to £11 12s. 6d.
Merino Wethers	23s.
Crossbred Wethers	25s. 6d.
Merino Ewes	21s. 6d.
Crossbred Ewes	22s. 3d.
Lambs	21s. 3d.
Pigs (Bacon)	59s.
Pigs (Porkers)	37s.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

Date.	January.		February.		March.		April.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·57	6·45	5·22	6·42	5·42	6·19	5·58	5·45
3	4·58	6·46	5·23	6·41	5·43	6·18	5·59	5·44
4	4·58	6·46	5·23	6·41	5·44	6·17	5·59	5·43
5	4·59	6·47	5·24	6·40	5·45	6·15	6·0	5·42
6	4·59	6·47	5·24	6·40	5·45	6·14	6·0	5·41
7	5·0	6·47	5·25	6·39	5·45	6·13	6·1	5·40
8	5·1	6·47	5·26	6·38	5·46	6·12	6·1	5·39
9	5·2	6·47	5·27	6·37	5·46	6·11	6·2	5·38
10	5·3	6·47	5·28	6·36	5·47	6·10	6·2	5·37
11	5·3	6·47	5·29	6·36	5·47	6·9	6·3	5·36
12	5·4	6·47	5·30	6·35	5·48	6·8	6·4	5·34
13	5·5	6·47	5·30	6·34	5·48	6·7	6·4	5·34
14	5·6	6·47	5·31	6·34	5·49	6·6	6·4	5·33
15	5·7	6·47	5·32	6·33	5·49	6·5	6·5	5·32
16	5·8	6·47	5·33	6·32	5·50	6·4	6·5	5·31
17	5·9	6·47	5·34	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·51	6·2	6·6	5·29
19	5·11	6·46	5·35	6·29	5·52	6·0	6·7	5·28
20	5·12	6·46	5·36	6·28	5·53	5·59	6·8	5·27
21	5·12	6·46	5·36	6·28	5·53	5·58	6·8	5·26
22	5·13	6·45	5·37	6·27	5·53	5·57	6·9	5·25
23	5·14	6·45	5·37	6·26	5·54	5·56	6·9	5·24
24	5·15	6·45	5·37	6·25	5·54	5·55	6·10	5·23
25	5·16	6·44	5·38	6·24	5·54	5·54	6·10	5·22
26	5·16	6·44	5·38	6·23	5·55	5·53	6·11	5·21
27	5·17	6·44	5·39	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5·56	5·51	6·12	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·57	5·49	6·13	5·18
31	5·21	6·43	...	...	5·58	5·48	...	...

Phases of the Moon, 1915.

On or about the 150th Meridian, East Long.

			H. M.
1 Jan.	○	Full Moon	10 20 p.m.
9 „	☽	Last Quarter	7 12 a.m.
16 „	●	New Moon	12 41 „
23 „	☾	First Quarter	3 32 p.m.
31 „	○	Full Moon	2 41 „

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

7 Feb.	☽	Last Quarter	3 11 p.m.
14 „	●	New Moon	2 31 „
22 „	☾	First Quarter	12 58 „

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

2 Mar.	○	Full Moon	4 32 a.m.
8 „	☽	Last Quarter	10 27 p.m.
16 „	●	New Moon	5 42 a.m.
24 „	☾	First Quarter	8 48 „
31 „	○	Full Moon	3 38 p.m.

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

7 Apr.	☽	Last Quarter	6 12 a.m.
14 „	●	New Moon	9 36 p.m.
23 „	☾	First Quarter	1 39 a.m.
30 „	○	Full Moon	12 19 „

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Farm and Garden Notes for March.

FIELD.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply cultivated soil. The latter should be rich and friable, with a porous subsoil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff clay subsoil. Prepare the land a couple of months before sowing, care being taken to cross plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case, 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Lucerne seed is worth from £5 10s. to £6 10s. per cwt. Should weeds make their appearance before the plants have sent down their tap roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90 Day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco seed, cowpea, carob beans, sweet potatoes, opium poppy, &c Sow anatto, jack fruit, and plant kola-nut cuttings. Some temperate-zone vegetables may be planted, such as egg plant, potatoes, &c. Coffee-planting may be continued. Harvest kafir corn and paddy.

FLOWER GARDEN.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—Amaryllis, anemone, arum, babiana, crinum, crocus, freesia, ranunculus, jonquils, iris, ixias, gladiolus, narcissus, Jacobean lilies, tigridia, tritonia.

All bulbs like well-drained, somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are antirrhinums (snapdragon), asters, cornflowers, dianthus, larkspurs, daisies, cosmea, candytuft, lupins, gaillardias, godetia, mignonette, poppies, pansies, phlox, sweet peas. Cannas now planted will require plenty of food in the shape of liquid manure. Put in cuttings of carnations. Chrysanthemums require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—*Allamanda Schotii* (beautiful yellow), *Antigonon leptopus,* a charming

cerise-coloured climber; *Aristolochia elegans,* handsome as an orchid and easily grown; *Aristolochia ornithocephala* (Dutchman's Pipe), very curious, large, always attracts attention; *Asparagus plumosa,* grows in any shady place; *Beaumontia grandiflora,* splendid white flower, grand for a fence, will grow 50 ft. high; Bignonias of several kinds; Bougainvilleas, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; *Quisqualis indica,* a fine creeper, flowers pink, changing to white; Wistaria, purple and white. Most beautiful is the *Bauhinia scandens,* rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of beautiful round bunches of blossoms, something like the hawthorn bloom —pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will in all probability grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th of March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for, if left on the vines to perfect their seeds, the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

Orchard Notes for March.

THE SOUTHERN COAST DISTRICTS.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and as they always select the first fruit that

shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on a barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit-flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit-fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit flies may also be caught in large numbers by means of such artificially ripened fruits. The fruits are smeared with tanglefoot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house-flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit flies.

The yellow peach-moth that does such damage to peaches in Spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the Codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, at the stem end of the fruit, and, in the case of navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead, will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit fly systematically—both by means of the sticky fruit already recommended and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs

of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry, case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

THE TROPICAL COAST DISTRICTS.

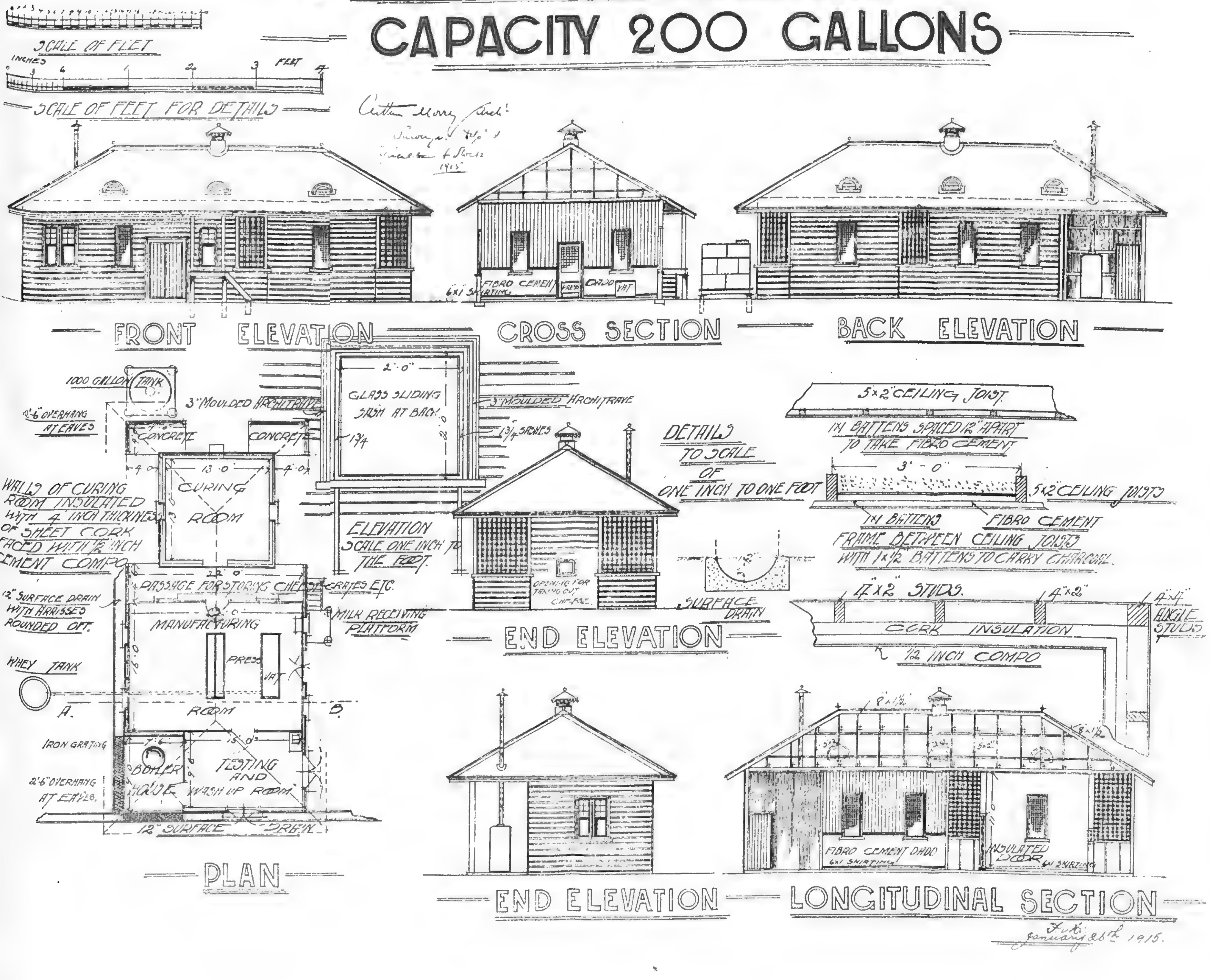
The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

THE SOUTHERN AND CENTRAL TABLELANDS.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked, and water where necessary.

PLAN OF CHEESE FACTORY
CAPACITY 200 GALLONS



QUEENSLAND AGRICULTURAL JOURNAL

VOL. III. MARCH, 1915. PART 3.

Agriculture.

NATAL WATTLE-BARK INDUSTRY.

Mr. W. Wayne, senr., writing to the "South African Mining Journal," says:—

Owing to the disturbed conditions now prevailing in Europe, the above industry has been practically brought to a standstill, on account of the wattle-bark buyer having centred this industry in Hamburg, Germany. Under these circumstances, the stripping of the wattle-trees during the present spring season will have to be delayed in consequence of the export market being closed. Last year's exports of wattle-bark totalled some 65,000 tons, which at a low average of £4 10s. per ton equals £292,500 deferred payment to the Natal wattle-growers for the season 1914 based on the 1913 returns. It has occurred to me to lay before you the forenamed loss, for the season 1914, with a view to calling the wattle-growers' attention to the necessity of forming themselves into a limited liability company for the purpose of raising capital to establish wattle-bark extraction factories in convenient centres of the Natal wattle-growing district. These factories would produce the tannin extracts in the right condition for British farmers' requirements. We find the British market object to handle the wattle-bark in its present exported condition as supplied to the Hamburg merchants. I observe, published in the "British South African Gazette," that tenders are being called for wattle extract plants. This journal states that the purchase of a plant costing £20,000 for manufacturing wattle

extract is to be taken in hand by a company formed for the purpose at Pietermaritzburg, Natal. The plant should be capable of dealing with 6,000 tons of raw material annually. Basing the provisional calculation on the above amount of £20,000 being capable of treating 6,000 tons, of raw bark, the present output of bark would require ten factories to treat the year 1913 quantity of bark. Ten factories at £20,000 each equals £200,000. Two hundred thousand pounds capital is required to manufacture their product into a marketable article suitable to British requirements. This would obviate the expense of long railage charges to the coast ports, and it would save the shipping expenses in bulk form to the port of Hamburg. The means of raising the capital for this object might possibly be secured on the following plan being adopted by all those engaged in the wattle industry:—(1) That for every acre of land under wattles the owner should guarantee to subscribe £1 or more to the company, such guaranteed amount to be deducted from the value of his wattle-bark returns when settlement was made; (2) the guaranteed amount could be extended over a period of one or more years, according to the discretion of the board of directors; (3) the capital being raised under the above guarantee would in course of time be returned to the original lenders, and in the meantime gradually bring a co-operative wattle-growers' manufacturers' extract company into permanent existence, and thus help to establish a profitable business for their growing industry. The present position in which the wattle-growers and buyers are placed to-day is one that requires every assistance to overcome this serious loss to those engaged in this industry. The present moment appears one favourable to proposing the flotation of these ten companies for this purpose, which should prove valuable to all concerned and of future benefit to the trade of the country. As a subscriber to your journal, I forward the above views on the wattle-growers' prospects for the year 1914."

"Durban, 5th September, 1914."

FODDER SUPPLIES FOR DAIRY STOCK.

Relative to providing fodder supplies for dairy stock, Mr. E. Graham, Dairy Expert, writes:—

The conservation of fodder by means of a silo would materially assist in providing the dairy stock with a ration of suitable food during winter months, or other period when the land is denuded of natural pastures, for it is known that silage properly cured, and prepared from an approved crop, constitutes the basis of a nourishing and succulent meal for the dairy cow.

Of the green crops to be recommended for winter feeding it is considered that field peas associated with skinless barley, cape barley, rye, and oats may provide the best rotation of crop.

The various crops would be ready for use in the order named if given equal opportunity for growth.

About half a bushel of field peas and one and three-quarters bushel either oats or barley to each acre should be planted, and the above quantity of field pea to one bushel of rye to the acre, is suggested.

Relative to Essex rape, all varieties of rape convey characteristic flavours to milk and cream, and these flavours in the absence of pasteurisation of the milk or cream are difficult of eradication. However, the tainting influence of this fodder is to be somewhat reduced by feeding it to cows immediately the process of milking is completed. The maximum degree of taint in the flavour of the milk occurs when fodders of this nature are fed to the dairy herd prior to or simultaneous with milking operations.

Acreage to be cultivated: An area of 10 to 16 acres is necessary to maintain a herd of fourteen (14) cows; and, naturally, the acreage cannot be definitely determined, as much depends upon the weather conditions prevailing during the time the crops are in the field.

According to the nature of the season the oat crop may or may not be required as green feed for the dairy stock, and should it be found that there is a surplus of green fodder on hand at the termination of the feeding season, the oat crop could, under such circumstances, be converted into hay, thereby avoiding any waste.

EXPLOSIVES ON THE LAND.

Mr. B. Stirling, of Mount Morgan, writing of his experience in the use of gelignite for blowing out stumps, says:—

"Having read a good deal in the Journal about clearing land, I give my experience with gelignite. Having some land which at one time teamsters used for a road, and was very hard, I decided to clear it of stumps, so I got a grubber and started digging. It took me two hours to get one stump out, so I decided to try gelignite. I can do more in two shots than I could in two days' work at grubbing, and those two shots would take me twenty minutes to bore, charge, and fire for very large stumps. To save gelignite, I blow the earth out from both sides, using two plugs for each side. The stump is generally cleared of earth to a depth of 3 ft., and very often so shattered as to be all ready to set fire to; the small stumps I have blown out with from one to three plugs of gelignite, thus getting rid of small stumps and saving very often ten plugs of gelignite, which would be required if the large stumps were blown out, and bringing the cost of clearing down very low, and, what is more, saving a lot of hard work at grubbing.

"For boring I use a 1-in. auger, 3 ft. long, with a brace at end for boring rapidly. I generally bore to a depth of 18 in., and very often only 12 in. for small stumps—under the stump, if possible; if not, then close to it. After boring out I ram the bottom of the hole firmly with a round wooden banister I use for a tamping rod. Then, if I decide to use three plugs, I break each plug in half, then press each half firmly until squashed solidly in the bottom of the hole. In the last half plug I place the cap with about 12 or 18 in. of fuse, according to the depth of the hole.

I then drop in fine earth, a little at a time, and press that down very gently until the hole is filled up. I next split the fuse, and place a little gelignite in the split and light it. It is wonderful how quickly and easily stumps can be blown out, and how quickly ground, even with green timber on it, is got ready for cultivation with no exhausting work.

"Let anyone in doubt take on grubbing for one day; then shoot out stumps next day. He will see the difference between hard work one day and a week's work done on the next day with gelignite by just boring a few holes and charging and firing."

Many people are afraid of explosives, but they are not half as dangerous, providing care is taken, as some think.

MARKET GARDENING.

CAULIFLOWER AND CELERY.

If it is desired to lift and store these vegetables on account of severe weather, or to cultivate the soil in preparation for the next crop, they may be lifted with as much soil as will cling to their roots, and be stacked upright in a cool shed to which light is admitted. The plants should be packed close together and the exposed side should be banked up with soil. In this way they will keep as long as in the open ground. The proper time to lift is about the end of October or during November for cauliflowers, and the middle of November for celery.

State Farms.

NOTES FROM KAMERUNGA STATE NURSERY, DECEMBER, 1914.

Rainfall for month, 5·71 in. Number of days on which rain fell, 10. During the last week of the month most trying weather was experienced, due to high winds from N.W. by W. A blow during the night of the 25th snapped off a number of bananas and papaws, besides more or less putting over some eighty coffee-trees, all of which had to be staked.

Coffee.—Trees all looking well. The green tips of primary branches of all young bearing trees were disbudded so that the tree would not be overtaxed; all the trees were topped, as, owing to the forcing season, the growth has been too quick.

Vanilla.—Having again had nice showers during the month, vines have continued to make good progress, and pods are swelling well.

C. E. WOOD,

Manager, Kamerunga State Nursery, Cairns, N.Q.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JANUARY, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Nellie II. ...	Shorthorn... ...	20 July 1914	933	3·8	41·57	
Miss Jean ...	Ayrshire	24 Nov. ,,	849	4·0	39·85	
Honeycombe	Shorthorn ...	27 July ,,	808	3·8	35·99	
Lady Melba	Holstein	6 Mar. ,,	751	4·0	35·21	
Miss Melba...	,, ...	22 Nov. ,,	1,082	2·8	35·19	
Butter ...	Shorthorn ...	20 Nov. ,,	880	3·4	34·97	
Simple Interest	Jersey	24 Nov. ,,	643	4·6	34·84	
Miss Lark ...	Ayrshire	31 Oct. ,,	735	4·0	34·46	
Madam Melba	Holstein	8 Sept. ,,	1,020	2·9	34·40	
Special Edition	Jersey	19 Dec. ,,	625	4·5	33·12	
Burton's Lily	Shorthorn ...	17 Nov. ,,	776	3·6	32·24	
Lady Margaret	Ayrshire	19 June ,,	721	3·8	32·09	
Daisy ...	Holstein	26 Nov. ,,	966	2·8	31·72	
Lucinda ...	Ayrshire	20 Sept. ,,	628	4·2	31·00	
Silver Nell...	Shorthorn... ...	5 Oct. ,,	693	3·8	30·85	
Bluebelle ...	Jersey	27 May ,,	611	4·2	30·16	Natural pasture only.
Miss Edition	,, ...	10 July ,,	470	5·4	29·98	
Burton's Lady	Shorthorn... ...	23 July ,,	669	3·8	29·79	
Sweet Meadows	Jersey	28 July ,,	446	5·6	29·52	
Rosebud ...	Ayrshire	20 Sept. ,,	770	3·2	28·72	
Lowla II. ..	Shorth'rn-Ayrshire	23 Sept. ,,	636	3·8	28·32	
Lady Lil ...	Jersey	22 Aug. ,,	496	4·7	27·47	
Glen ...	Shorthorn... ...	26 Oct. ,,	775	3·0	26·98	
Miss Bell ...	Jersey	13 Aug. ,,	474	4·8	26·82	
Pauline ...	Shorthorn ...	12 Oct. ,,	757	3·0	26·41	
Lark ...	Ayrshire	27 July ,,	663	3·4	26·33	
Davidina ...	,, ...	17 July ,,	557	3·8	24·78	
Rosine ...	,, ...	23 Sept. ,,	502	4·2	24·75	
Dollie ...	Shorthorn ...	19 Dec. ,,	602	3·4	23·91	
Laurette II.	Ayrshire	10 Nov. ,,	682	3·0	23·82	
Countess of Brunswick	Shorthorn... ...	27 July ,,	647	3·0	22·59	
Lady Spec ...	Ayrshire	24 Oct. ,,	574	3·2	21·40	

RELATIVE TO ADDITION OF FISH OILS TO SKIM MILK, ETC.

In response to a letter to the Department addressed to Messrs. Barnes and Co., Ltd., Mr. G. Green, of Goomburra, relative to the addition of fish oils to skim milk as a cheap and valuable food for stock, in January last, Mr. E. Graham, Dairy Expert, wrote:—

Animals have a natural repugnance to highly rancid and offensive smelling oils, and for this reason some grades of fish oil are not suitable for the purpose in question.

However, the addition of either animal or vegetable oil to skim milk would increase its feeding value. Average cow's milk contains from 3½ to 4 per cent. of butter fat, consequently that is the percentage of oil that is to be added to the skim milk in order to replace the amount of fat extracted from the milk by the process of "separation."

In the actual feeding of added oil and skim milk to swine, there is usually a difficulty in getting the oil to emulsify with the skim milk, but this trouble is possibly easiest of adjustment by pouring the oil on a little dry pollard and allowing the pollard to absorb it; then mix the oil-laden pollard with the skim milk in the required proportion. Cocoanut-oil cake is specially valuable for the purpose of feeding to lower animals in conjunction with skim milk, as the oilcake contains a considerable amount of nitrogenous matter in a form that is easily to be assimilated.

Concerning molasses and its sugar-content: Sugar-mill molasses contains from 45 to 60 per cent. of sugar, and the molasses may be fed to swine in conjunction with other food, but as the molasses has a laxative influence, it is not to be fed in excessive quantities.

CREAM AND BUTTER FAT.

In reply to a letter from a correspondent, relative to the difficulty experienced in making the cream yield up its butter fat, Mr. E. Graham, Dairy Expert, says:—

There are several causes influencing the churning of cream, and in the absence of a full knowledge of the particulars governing the specific case under review, it is possibly best to treat briefly with the causes that are most probably responsible for the trouble.

Occasionally it happens that a churn of unsuitable pattern is employed for the service of churning cream. In a general way hand-power churns are to be classified under three headings—viz., the plunger, dash, and paddle principle, the firstnamed being the least satisfactory.

Again, the cream may not contain sufficient acidity at the time its churning is attempted, and in this case the remedy most likely to be effective is to allow the cream to ripen for another day before churning operations are commenced.

Further, there is a possibility that the butter-fat content of the cream may be unduly low and the process of churning retarded as a consequence. An adjustment of the cream screw of the separator would remove this difficulty, and result in the production of a "thicker" cream. Should the cream, after attention has been given to the above matter, still maintain its reluctance to churn, then place the churn containing the cream in a bath of warm water for several minutes, and renew churning operations.

If the above measures prove ineffective in inducing the cream to churn, it is obvious that the cause arresting the churning of cream is attributable to the stage of growth of the pastures to which the cows have access, and only a change in the nature of the fodder consumed by the dairy stock will restore the cream to a normal condition.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY, 1915.

Five thousand two hundred and nine eggs were laid during the month. Owing to some of the birds having broken into moult, there has been a slight falling off; but, taken altogether, the output of eggs has been very good for this time of the year. One of Mr. Fanning's White Leghorns died of heat apoplexy, and has been replaced. Mr. E. V. Bennett's White Leghorns win the monthly prize with 158 eggs. The following are the individual records:—

Competitors.	Breed.	Jan.	Total.
A. T. Coomber	White Leghorns	131	1,328
Moritz Bros., S.A.	Do.	154	1,306
Loloma Poultry Farm, N.S.W.	Do.	149	1,298
T. Fanning	Do.	115	1,287
Geo. Tomlinson	Do.	136	1,238
Cowan Bros., N.S.W.	Do.	137	1,221
Loloma Poultry Farm, N.S.W.	Rhode Island Reds	124	1,205
R. Burns	Black Orpingtons (No. 1)	130	1,205
A. F. Camkin, N.S.W.	White Leghorns	141	1,202
Kelvin Poultry Farm	Do.	104	1,197
A. H. Padman, S.A.	Do.	149	1,192
Mrs. Munro	Do.	141	1,188
E. Le Breton	Do.	137	1,186
Marville Poultry Farm, Victoria	Do.	153	1,185
T. Fanning	Black Orpingtons	143	1,168
R. Burns	Do. (No. 2)	136	1,158
E. V. Bennett, S.A.	White Leghorns	158	1,158
Derrylin Poultry Farm	Do.	138	1,158
Mrs. Bieber	Brown Leghorns	132	1,157
R. Burns	S. L. Wyandottes	122	1,144
F. McCauley	White Leghorns	142	1,140
J. T. Coates	Do.	139	1,137
J. R. Wilson	Do.	115	1,132
J. Franklin	Do.	122	1,132
J. T. Coates	Black Orpingtons	110	1,121
J. M. Manson	Do. (No. 1)	136	1,117
G. E. Austin	Do.	121	1,111
J. Kilroe	Do. (No. 2)	137	1,105
R. Jobling, N.S.W.	Do.	109	1,097
J. Zahl	Do.	145	1,090
J. Gosley	Do.	121	1,087
Range Poultry Farm	Do.	128	1,080
D. Moreton, N.S.W.	Do.	131	1,073
J. D. Nicholson, N.S.W.	Do.	118	1,063
Mrs. Bradburne, N.S.W.	Do.	105	1,035
J. N. Waugh, N.S.W.	Do.	135	1,027
C. M. Jones	Do.	105	1,026
J. Kilroe	Do. (No. 1)	106	1,018
J. Murchie	Brown Leghorns	124	1,017
J. M. Manson	White Leghorns (No. 2)	130	1,001
Totals	...	5,209	45,790

The Orchard.

A FINE PEACH.

We have been shown by the Director of the Intelligence and Tourist Bureau a very fine peach grown by Mr. H. M. Jones, of Rural Retreat, weighing 10¼ oz. It is a very handsome freestone fruit, and Mr. Jones's

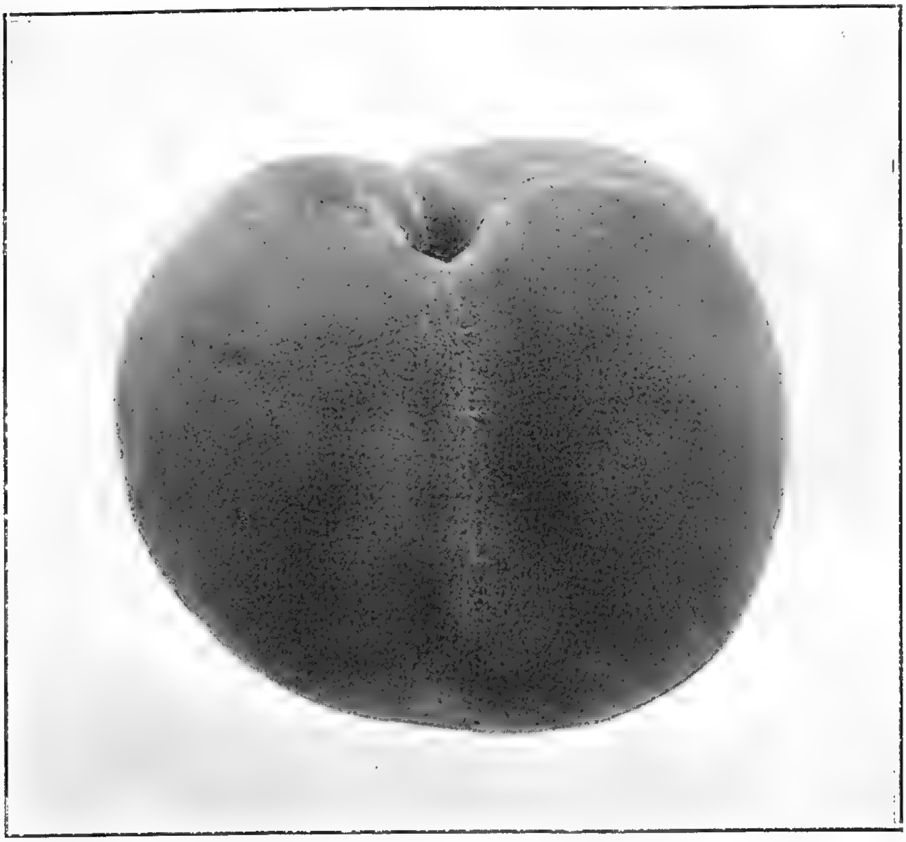


PLATE 5.—PEACH GROWN AT STANTHORPE BY MR. H. M. JONES, RURAL RETREAT; WEIGHT, 10¼ OUNCES.

peaches were awarded first prize in their class at the recent Stanthorpe Show. A model cast of this peach has been made for permanent exhibition at the Bureau. Some time ago we were asked in London 5s. each for peaches of this class.

SUGAR BANANAS AT SUNNYBANK.

Mr. M. McLaughlin, who grew the bananas here depicted, says:—"This hand of fourteen bananas, weighing 3 lb., cut from a bunch of seven dozen and a-half, have had no watering and only 2 in. of rain during the past six months. I attribute the size to the formula advised

in the "Agricultural Journal," viz., one part sulphate potash and two of superphosphate of lime and blood and bone with a little stable manure in two dressings annually of 3 lb. each. The plants are 12 ft. apart, and grown in groves do better than in single lines because of the shade one row casts on the roots of the other."

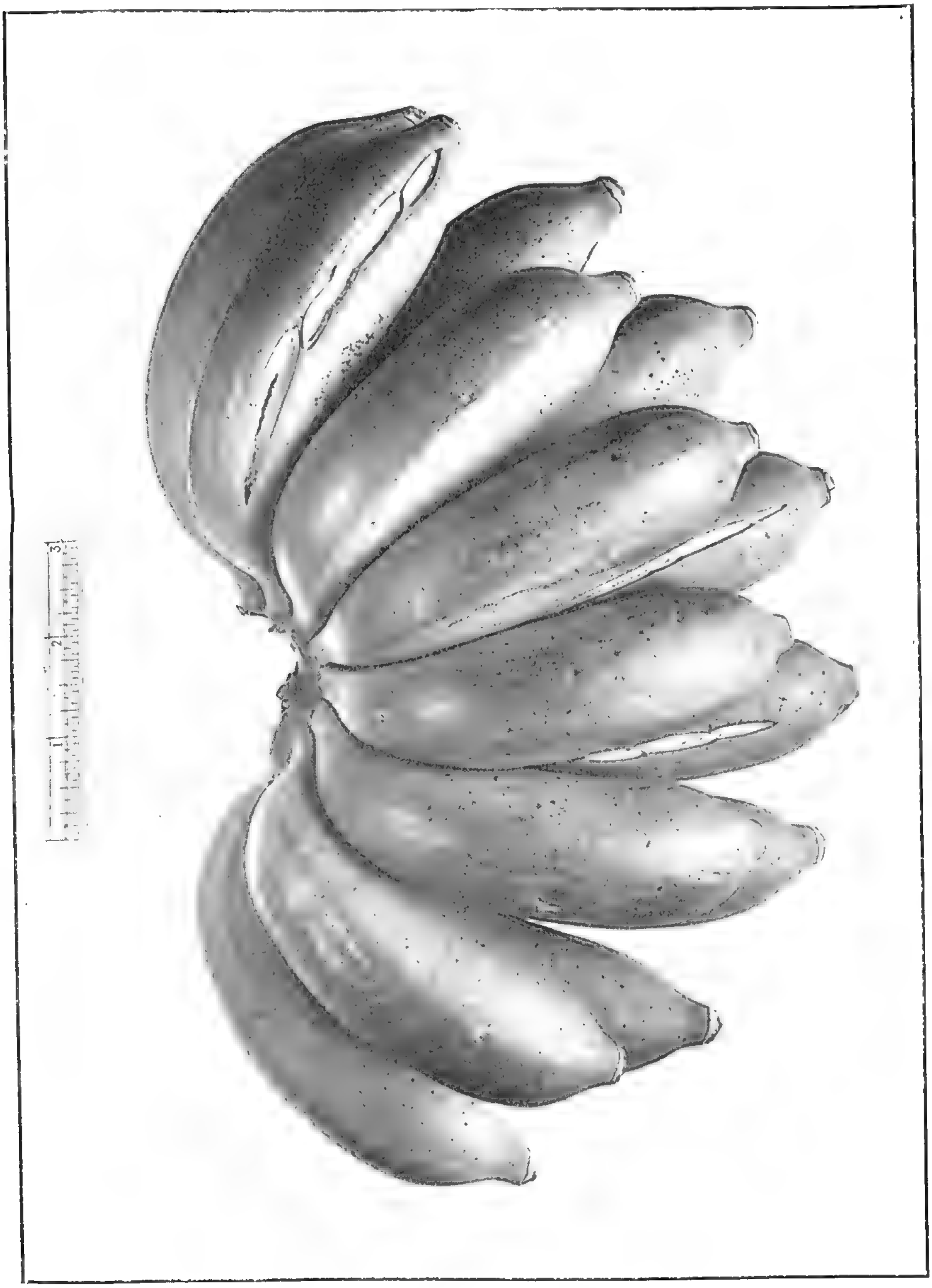


PLATE 6.—SUGAR BANANAS GROWN AT COOLIBAR, SUNNYBANK, BY MR. J MCLAUGHLIN.

REJUVENATION OF BANANA PLANTATIONS.

"No other cultivated plant exhausts the soil to such an extent as bananas," writes Mr. J. C. Brünnich, Agricultural Chemist, in a paper read before the International Congress of Tropical Agriculture. Isolated cases of abandoned old banana fields being replanted and yielding good crops, even without the aid of manures, have been reported in Queensland.

On this subject a very interesting article is published in "The Philippine Agriculture Review," vol. vii., 1914, entitled "The Rejuvenation of Depleted Abacá Fields," by F. P. Nickles, Agricultural Inspector.

The Abacá is the species of banana known as *Musa textilis,* from which Manila hemp is obtained. What holds good in the renovation of an Abacá plantation, will, it is reasonable to suppose, hold good with any variety of the Musa family. The article referred to is well worth the attention of banana growers in Queensland, and reads as follows:—

"The methods generally used at the present time for the production of abacá are practically the same as they were many years ago when the fibre began to be an important article of commerce in the Philippine Islands. During these years great advances have been made in agricultural pursuits, and the question may well be asked as to whether the methods used to-day for the production of abacá are the best that may be had with our present knowledge of the science of agriculture.

"In January, 1912, the Bureau of Agriculture started a series of experiments at the La Carlota Experiment Station, in Occidental Negros, to determine some of the many points in which it seemed probable that improvements might be made. These experiments are far from completed at the present time, but already they have proved instructive. Individuals, also—notably in the Moro Province—have attempted certain changes in their usual methods and with considerable success. Based upon results of tests and investigations made by the Bureau of Agriculture, and upon methods adopted to advantage by various individual planters, certain methods have recently been devised for the production of abacá which are decidedly superior to the general practice now in use. For the purpose of bringing them before the abacá producers, demonstration work was recently started in the Bicol Provinces, and it is hoped that eventually these methods may be generally adopted throughout the abacá-producing provinces. It is the purpose of this paper to fully describe them so that they may be sufficiently understood to put them to practical use.

"First, the conditions as they exist in the industry to-day should be described so that the application of any system of improvements may be better understood. If the old abacá fields are compared with those more recently planted or with those which are more favourably situated with respect to soil fertility, one quickly realises that a very large percentage of the abacá land is producing much less fibre than it could. In many districts there are, of course, large areas of virgin soil, suitable

for abacá, which might be planted and which would produce a superior crop for several years. Most of this land is inaccessible, however, and with the common methods in use it would eventually degenerate to a state similar to that existing at present. Improvements should be applicable to the older abacá fields as well as those to be planted for the first time.

"In considering the present methods for growing abacá, the lack of any process which can be called genuine cultivation, using the word in its narrower sense, should be noted. The nearest to it that may be found in the abacá fields is a spasmodic cutting of grass and weeds with the bolo. The life of the abacá plant is twelve to twenty years. When the plants die they are replaced by transplanting a few single plants to the spots left vacant, and the planting is done unsystematically and too closely. There is practised neither cultivation, rotation of crops, nor fertilisation in any form. That they produce as well as they do is a proof of the fertility of Philippine soils.

"Naturally, then, cultivation is the first and most logical way to bring about the desired increase in the yield of plantations. At present there does not seem to be any crop which may be grown extensively in rotation with abacá. As for fertilisation, the usual practice of applying commercial fertilisers or animal excrement is, in the majority of cases, too expensive to be justifiable. From cultivation an elimination of foreign vegetation, a more rapid conversion of plant food in the soil into a form available to abacá and a great improvement in the physical condition of the soil may be expected. These results would tend directly to increase the growth of the plants. Cultivation, however, necessitates the expenditure of money. Since the returns per hectare are relatively low in this industry, the problem is to keep this expenditure down to a point where it is justified by the increase in profits. This has been accomplished by using cowpeas (sitao) as a cover crop and green manure. The principle features of these methods are, *absolutely clean preliminary cultivation*, and the *planting of cowpeas as a cover crop and green manure.*

"The best time to start the preliminary cultivation is the last part of the dry season when the hot sun and the generally dry conditions greatly assist in the killing of weeds and the burning of trash. By the time the preparation is finished, the rainy season will be at hand and the field may be planted.

"The clearing of the field is the first operation. All trees, brush, and old abacá should be dug up and removed or burned. Exception may be made to a few varieties of trees which are beneficial to abacá for their shade. It is better, however, to remove all trees. Shade-trees may be planted later in a systematic manner. When the larger vegetation is removed, the field should be ploughed, the number of times depending on conditions, but not less than three times will always be necessary. A period of one week may advantageously be left between ploughings in order that weeds and grass lying exposed may be killed by the sun. The ploughings should be at least 20 centimetres in depth.

If light ploughs are used, this depth may easily be reached by passing the plough twice in the same furrow. The field should finally be harrowed once or twice to smooth it.

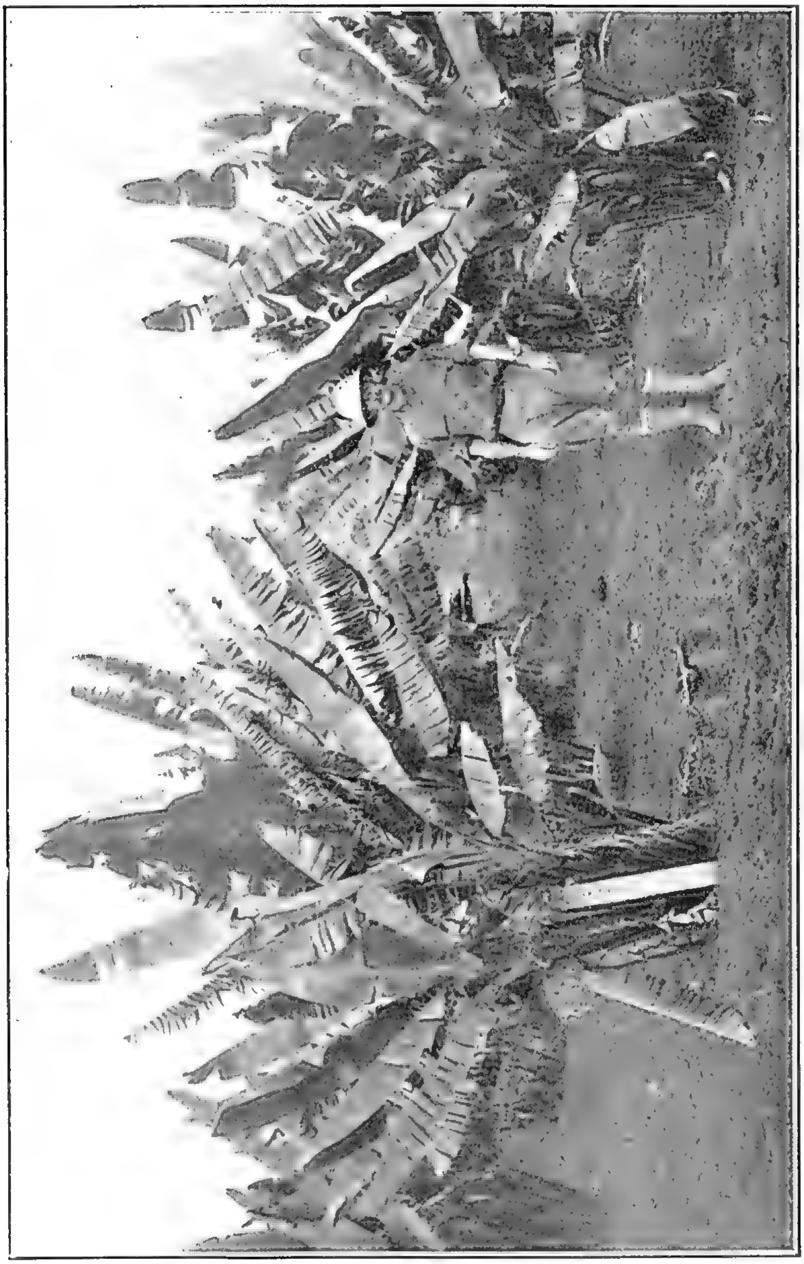


PLATE 7.—NEW, VIGOROUS, AND LUXURIANT ABACA GROWN BY THE NEW METHOD ON THE SITE OF OLD AND DEPLETED PLANTS LA CARLOTA EXPERIMENT STATION.

"The best plough to use in large and comparatively level fields free from rocks is a heavy steel plough requiring the use of four animals. This ploughs a deep, wide furrow and is not easily broken on roots or stumps. Since many of the labourers in the abacá districts are not familiar with heavy ploughs or the handling of so many animals

together, the light steel ploughs requiring only one animal may be used. These would also be better in rocky and small fields. Ploughs of this type with a single handle are sold by two or three companies in Manila at very reasonable prices. The ordinary native plough, which merely scratches the top of the ground, is of no value in this work. Several types of harrows might be used but probably the best for the purposes of the abacá grower is the type called the 'Shear harrow.' This has the advantage of being comparatively light, and, since one is not apt to encounter heavy sod in abacá fields, it will do efficient work. Cultivators will also be necessary, to take the place of the harrow after the abacá has been planted. The only other tools needed are shovels to be used in planting the abacá, the round-pointed kind being the best.

"The planting should be done about the beginning of the rainy season or shortly before. In this connection, it is best to plant the cowpeas first. In case seed is not available at the time, they may, however, be planted after the abacá is up. The cowpeas should be sown broadcast, rather thickly, and harrowed in by the cultivator or smoothing harrow, care being taken that they are sown evenly. If the ploughing has been recent, the last smoothing may serve to cover them. In case it is necessary to sow the cowpeas after the planting of the abacá, it will be necessary to wait until the abacá is up, when they may be sown broadcast as in the first case and covered with the cultivator, passing the latter between the rows of abacá.

"The abacá should be planted immediately after the cowpeas or at least before they are up, in check rows at a distance of 3 metres. The first operation is to mark off the field. For this a tape and a supply of small, rough stakes will be necessary, the latter to mark the position of the hills of abacá. Where fields of some size are to be planted, a long wire tape would be useful. This may be made of light wire and every third metre marked by a ring, link, or in some other manner. With the tape, lay off a base line along the longest side of the field and mark it off into 3-metre lengths by the stakes. At one end of this line and at right angles with it, lay off another line along the end of the field, marking this line also into 3-metre lengths. Next, by placing one end of the tape at the second stake in the base line and passing it (the tape) through a point 3 metres from the farthest stake in the other line, a second row of stakes may be added. This row of stakes will represent the second row of abacá. If this process is continued across the whole field, it will be laid off into 3-metre squares, the corners of the squares (marked by stakes) being the positions of the hills of abacá. Holes, 20 to 30 centimetres in diameter and 30 centimetres in depth, should then be dug at the location of each stake for the reception of the plants.

"For planting, abacá rootstocks should be used—that is, the underground part of the stalk. These may best be secured by digging up the entire plant and then cutting off the stalk, the cut to be made about an inch above the crown of the root. The best rootstocks come from plants which are not too old, and rootstocks which are 12 to 15

centimetres in diameter at the top are better than larger or smaller ones. Each should have at least three healthy buds. In practice, when two or more fields are to be planted in one season, the clearing of the second field can be postponed until the first is planted. Rootstocks may then be secured from the second field to plant the first. In some cases, also, if the preparation is done quickly and is immediately followed by the planting, the rootstocks from the same field may be used for replanting. They will keep for some time. In planting the rootstocks, one should be placed right side up in each hole and covered, not too deeply, but at such a depth that the top will be about 5 centimetres from the surface of the ground.

"It might be well to explain the reasons for using rootstocks instead of large or nearly mature plants as is the usual custom. Plants developed from the buds of a rootstock are usually much stronger and faster growing than those from a large plant. When the latter is transplanted, the roots are damaged and most of the energy of the plant goes to keep it alive. Rarely more than one or two suckers develop and they, being ill-nourished, make a slow growth. By the usual methods the use of large plants might be justified, since the little plants growing from a rootstock in the midst of grass and weeds would probably die unless mothered by an older plant until they were able to take care of themselves. There are no weeds, however, with these methods, and at the end of a year there would be several good-sized plants each with its own root system, while with the other method there would be one worthless stalk and a few small suckers.

"At this point may properly come the question of shade-trees. There is no experimental evidence on this question. Their value in any case would depend largely on the season and on the usual distribution of humidity throughout the year. In the Bicol Provinces the consensus of opinion among the abacá growers is that they are of considerable value but not absolutely necessary. In those provinces there is a distinct dry season and sometimes droughts of greater or less severity. Probably a judicious use of shade-trees would be advantageous, not only for shade but for the protection they would give from high winds. If used, they may be planted at any time after the planting of the abacá, in check rows at a distance of 21, 25, or 27 metres, depending on the size that the tree will reach at maturity. These distances have been chosen so that the trees may be planted with the rows of abacá, giving as little trouble as possible in cultivating the field. The variety or varieties chosen should be from the three or four generally accepted as the best for this purpose. There are two varieties of dap-dap (*Erythrina indica*, Lam.), leguminous trees, which are good; and there are one or two other good varieties. A shade-tree to be of value should be deep rooted, quick growing, and have a wide low head which does not give too heavy a shade. It is almost necessary that they be leguminous. There is a growing custom in the Bicol Provinces of planting pili trees in the abacá fields. The pili tree is not a good shade-tree,

and it robs the abacá of food material, and would, therefore, be detrimental to the latter. It is possible, however, that the income from the nuts would more than offset the loss in abacá. This question will have to be left to the experience and judgment of the grower.

" From the planting of the abacá, the field should need no attention (shade-trees excepted) until the cowpeas have matured—a period of three to three and a-half months. At this time it will be necessary to harvest the crop of cowpea seed so that it may be available for replanting. The pods may be picked by hand and afterwards threshed. The vines should at once be turned under with the plough to serve as a green manure. Some care should be taken in turning them under. If they are very rank, it would be well for a man to follow the plough to lay them along the furrow. Otherwise, they will gather in bunches in front of the plough, and those which are not covered will catch on the cultivator when the cowpea seed is covered.

" A second crop of cowpeas should be planted very soon after the vines ploughed under. This may be done in the same manner as before, by sowing them broadcast and covering them with the cultivator. If the supply of seed is insufficient for this, it may be sown in drills, three rows of cowpeas between each two rows of abacá. The drills may be marked out by the plough and the sowing and covering done in one operation, the covering being done by the feet. The first method is preferable, for in the latter weeds may spring up before the cowpeas completely cover the ground.

" The process of replanting the cowpeas should be continued for a period of fourteen to eighteen months. When a crop of cowpeas matures it should be harvested, the vines ploughed under, and the crop promptly replanted. At the end of the eighteen months, or earlier in some cases, the abacá will be so large and the hills so wide that animals passing between the rows will break the abacá; furthermore, the grounds will be so shaded that the cowpeas will not grow.

" It is well to note what would be accomplished by the use of the cowpeas. First, the field is thoroughly prepared and cleared of all weeds. Then follows the planting of the cowpeas and the abacá. Within a week the cowpeas will be well up, and within three weeks they will completely cover the ground.

" Since the field was thoroughly cleared of weeds in the first place, they will not start for some time, and those that do spring up later will be choked by the thick matlike growth of the cover crop. If each crop of cowpeas is replanted as soon as mature, it will result in a field free from weeds for the whole period of eighteen months. The cost of this will have been the cost of harvesting, ploughing, and replanting the cowpeas three or four times a year—a very reasonable expense. From four to six crops will have been incorporated in the soil, each returning not only what it took out but the nitrogen which it absorbed from the air. The effect on the physical condition must also be considered. The vines, ploughed under, add so much decaying vegetable matter or humus to the soil—a substance making it light and friable and most favourable

PLATE 8.—SIX-MONTHS-OLD ABACA PLANT GROWN ON AN OLD PLANTATION WITH THE NEW METHOD. COWPEA COVER CROP IN FOREGROUND. LA CARLOTA EXPERIMENT STATION.

for the growth of most of our domestic plants. Soil in this condition will absorb water readily, and a larger part of the heavy precipitations during the rainy season will soak into the ground instead of running off. In the case of a bad drought, this one factor might be of great value. No other crop can take the place of the cowpeas. Camotes, which are

frequently planted when new ground is cleared, while they help somewhat in keeping down the weeds, do not make the rank growth of the cow-peas, and, not being leguminous, they reduce the fertility of the soil rather than add to it. Peanuts and some other leguminous crops could be used but generally their growth is not heavy enough to give full protection from weeds. Mongo is probably the only substitute that could be used successfully, but this crop has not been proven entirely satisfactory in many localities. It is seen, then, that the cowpeas serve several purposes: They take the place of a large amount of cultivation that would otherwise be necessary; they act as a fertiliser, adding more plant food to the soil than they take out; and they improve the physical condition of the soil, indirectly also, and lessen the danger of a drought by increasing the absorption of moisture.

"At the end of eighteen months the cowpeas may no longer be planted. The abacá will have attained considerable height, and the hills will have spread until practically all of the ground is shaded. The field should average not less than fifteen stalks to the hill. The stalks will not have attained their greatest size until a year or two later; but, what is of greatest importance, they will be in an actively growing condition. Well nourished from the beginning, they will develop much faster than abacá grown under ordinary conditions, and weeds, if they eventually creep in, will have less advantage over them. They will have a resilience, a latent force, to recover quickly after a severe drought, typhoon, or any other destructive force over which the planter has no control.

"Cultivation may be discontinued from this period until after the fourth or fifth year or until the field has been harvested three or four times. The harvesting of the mature stalks allows the sun to penetrate to the soil and steps are again necessary to prevent the growth of weeds. This may best be accomplished by using the plough and cultivator. If, as the field grows older, the plough and cultivator are impracticable, regular and systematic use of the hoe may be resorted to. The bolo method which is practised at present has never been effective.

"The above methods are based upon agricultural principles which have been well tested and which are successfully used to-day in actual practice. The only doubt that the abacá grower can have is one of financial success. Every crop has a limit where increased care and cultivation will not bring increased profits, but in the production of abacá care and cultivation are practically nil. A certain amount of cultivation, judiciously applied, should well repay itself. The average yield of fibre per hectare in the islands is less than 380 kilos (6 piculs), and it is doubtful if the best of the ordinary "lates" in the Bicol Provinces exceed 575 kilos (9 piculs) per hectare. By the above methods, under ordinary conditions, a planter should be able to harvest about 650 kilos (10 piculs) per hectare the third year, and 1,000 kilos (16 piculs), or more, thereafter. Just how long a field cultivated by the above methods would hold its superiority would depend upon how

clean it was kept, how heavily the abacá was cut, and other factors, but it should turn out more than the ordinary crop for a period of about fifteen years.

"A planter considering the adoption of these methods should not think that he has to grow all his abacá under this system. Nearly every planter has a few "lates" which have been recently cleared and planted or which are favourably situated with regard to fertility, the yield of which is above the ordinary. He may also have some that are situated on steep hillsides or that are very rocky, which would make cultivation like the above exceedingly difficult. Such fields may be left while attention is given to the older and more impoverished. Almost without exception these are the ones which may be most easily cultivated. The best plan would be to clear and plant a number of hectares each year—say, from 5 to 10, according to the ability of the planter. Even 2 or 3 hectares a year, in ten years, would convert his worst "lates" into the best on the hacienda. It should be realised that after the second year returns will begin to come in, and by the fourth year a field should have paid for the original expense and any other expenses dependent upon the use of these methods.

"The following is a fair estimate of the cost of clearing, planting, and cultivating 1 hectare of abacá up to the end of the eighteen months. Sixty-five centavos, without meals, has been taken as the daily wages for labourers.

	Pesos	Pesos.
Clearing	30	
Ploughing and harrowing	10	
Preparing rootstocks and planting cowpeas and abacá	25	
Total preliminary expenses		65
Ploughing under and replanting cowpeas four to six times during the first eighteen months		20
Total expense, clearing, planting, and cultivation during the first eighteen months		85

"The aforementioned cultural methods have special reference to the renovation of old abacá fields. With slight modifications in the preliminary preparation, they may also be used advantageously in the planting of new land. It should be understood that the methods have not been described completely in every detail. These may be worked out by the planter himself to suit the peculiar conditions of his plantation. The main points, however, should be carried out, and the planter should not forget that absolutely clean preliminary cultivation is the foundation upon which these methods are based, and the proper use of the cowpeas is necessary for their successful operation.

1 hectare = 2·471 acres; 1 kilo = 2·2 lb.; 1 metre = 1·09 yards; 1 centimeter = 0·39 in. (about $\frac{2}{5}$ in.)

Horticulture.

AGRICULTURAL EXPERIMENT GARDENS IN CONNECTION WITH PUBLIC SCHOOLS.

By P. R. GORDON.

Reference was made, a few weeks ago, in the Brisbane Press, to a new and very prolific potato raised by the senior pupils of the public school at Drumwhindle, in the parish of Ellon, Aberdenshire. This school is situated a few miles distant from where I was born and spent the earliest years of my life, and I have taken a lively interest in it. The head master, Mr. Lewis Gavin, is an enthusiast on the subject, and his work has been recognised by the Education Department and his services requisitioned in the organisation of similar schools in other centres. His success in engendering in the youthful minds a taste for the cultivation of the soil, leading them to become, in after life, primary producers, instead of attracting them to cities and towns to join forces with the many engaged in secondary industries whose sole existence is dependent on the produce of the soil, has been very marked. But it is not in agriculture alone that the pupils receive instruction. Æsthetic taste is encouraged, particularly among the younger pupils in the cultivation of flowers, and many of them carry the work on at their homes, with the result that around many of the cottages in the district are neat flower gardens where formerly the vegetation consisted of " kale runts " or useless weeds. The objects of the school garden are many. Not only has the observation of the pupils to be trained and sharpened, but experiments have to be made to find out definite results for the successful cultivation of plants by observing their habits, their likes and dislikes so as to obtain their fullest fruition. Those experiments entail a great amount of care, accuracy, and watchfulness in the youthful gardeners, which early inculcates in them habits of method and desire for truth. Many experiments are conducted at the garden—some failures, many most interesting and useful to the farming community, as in root selection, in potato-growing, and in the use of artificial manures. In potato cultivation five definite results were arrived at:—The wider the tubers were planted the greater the yield. In fact, it was surprising to find no less than 4 tons per acre in yield between those planted in drills 3 ft. apart and 1½ ft. between sets. 2. Tubers " greened " and sprouted have a marked difference of being at least a fortnight earlier in maturity than those planted from the pit, and come above ground regularly with very few blanks, and greater in yield. 3. Tubers, whole, and about the size of a duck's egg show positively for the fourth year in succession a difference of 6 tons 9 cwt. 72 lb. per acre, in comparison with those cut and weighing practically the same before planting as the cut tubers. 4 (and very important). The drills ought to run north and south, as the drills are exposed on one side only if running east and west, and are not

acted on equally by the sun's rays, which play a very important part in the cultivation of good sound tubers. The difference in yield amounts to about 2½ tons per acre. Each row shades its neighbour and prevents the growth of tissue and tuber as in rows running north and south. 5. From this it may be deduced that too deep planting has to be avoided, and by experiments, 4, 5, 6, and 7 in. deep, the yield from a depth of 4 in. is the most satisfactory. The following varieties were grown last year, and the results show the relative value in yields:—

	Per Acre. Tons.	Cwt.	Lb.
1. British Queen	7	13	106½
2. Ashleaf	5	8	4
3. Duchess of Cornwall	8	10	18
4. Balgownie Seedling	12	11	20½
5. Faithlie	8	10	17
6. Snowdrop	15	16	0
7. Harbinger	3	15	73
8. Devanha Seedling	5	18	94
9. Fortyfold	6	15	5
10. Reading Russet	14	13	5
11. Drumwhindle (seedling)	17	11	13
12. Cottar	14	11	78
13. Crofter	14	11	0
14. Shetland Champion	14	0	100
15. Grampian	8	4	84
16. Up-to-date	15	10	12

It will be seen from the above that the school seedling (Drumwhindle) is the most prolific of the whole. It was sold by the pupils to a well-known firm of seedsmen for £40 per ton. They were tried at the Royal Horticultural Society's Station, in Surrey, and proved a remarkably good "cropper" and "cooker," a most marketable variety, having no deep eyes, and what there are are on the apex.

The experiments with artificial manures (which were gifted to the school) gave very interesting trials in the various plots, containing potatoes, cabbages, eschalots, parsley, and turnips, to determine the effects of the various manures on each of these. The results are given in the following table:—

Manure.	Potato. Lb.	Cab'ge. Lb.	Eschalot. Lb. — T'tl.
Sulphate of Potash	61½	84	3¾—149¼
Superphosphate	66	76	3⅛—145⅛
Nitrate of soda	61¾	90	2¼—154
Sulphate of ammonia, + sulphate of potash ..	66¼	92	5⅛—163⅜
Sulphate of potash, + superphosphate	56½	72¼	3¾—132½
Sulphate of ammonia, + superphosphate	66	82	3⅞—151⅞

The effect was seen in the various colours of the leaves, those treated with nitrates especially being of a very dark green, but having a tendency in the tuber crop to grow too much to stem. Of grasses, small patches were sown with home svalof (Sweden), grown samples

of clover, timothy rye, and cocksfoot, and in each case the svalof seed was much stronger and the produce much freer from obnoxious weeds.

One can easily imagine the beneficial effects of these experiments on the pupils in developing correct observation and their reasoning faculties. But the greatest value of these studies is that they have attracted the youthful mind to settlement on the soil. The pupils are not only allowed to conduct their experiments—of course, under surveillance—but they are entrusted with the sale of their products, so that a healthy rivalry is set up between the different groups of youthful experimenters; the money from sales being devoted to garden work.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Jan.	No. of Years' Records.	Jan., 1915.	Jan., 1914.
North Coast.	In.		In.	In.
Atherton	14·97	13	2·56	7·23
Cairns	18·83	27	3·29	21·69
Cardwell	17·54	27	10·02	21·68
Cooktown	15·24	27	8·19	33·93
Herberton	10·49	27	0·90	6·41
Ingham	16·95	22	13·95	17·36
Innisfail	25·28	27	7·97	15·52
Mossman	22 71	5	6·32	32·50
Townsville	13 70	36	9·33	14·90
Central Coast.				
Ayr	12·11	27	2·12	10·11
Bowen	11·05	27	0·34	6·83
Charters Towers ...	6·45	27	1·58	2·95
Mackay	15·73	27	2·94	22·52
Proserpine	18·23	11	1·02	11·19
St. Lawrence ...	11·23	27	1·73	7·97
South Coast.				
Biggenden	5·18	14	3·23	1·33
Bundaberg	10·62	27	3·86	1·39
Brisbane	6·52	64	2·11	3·90
Childers	9·01	19	2·43	2·20
Crohamhurst ...	13·44	22	5·78	6·71
Esk	5·71	27	5·43	2·58
Gayndah	5·76	27	5·59	4·13
Gympie	7·55	27	4·97	5·05
Glasshouse M'tains	10·09	6	8·66	6·27
Kilkivan	6·49	27	3·10	1·52
Maryborough ...	8·33	27	3·39	2·07
South Coast—continued:	In.		In.	In.
Nanango	4·78	27	2·15	3·25
Rockhampton ...	9·54	27	4·26	0·74
Woodford	7·40	27	2·78	4·06
Yandina	10·45	21	6·23	6·95
Darling Downs.				
Dalby	3·75	27	2·40	3·28
Emu Vale	3·32	17	3·83	1·95
Jimbour	4·13	24	1 90	2·27
Miles	4·17	27	0·38	2·60
Stanthorpe ...	4·16	27	3·36	2·06
Toowoomba ...	5·69	27	2·33	3·73
Warwick	3·89	27	1·74	1·52
Maranoa.				
Roma	3·77	25	0·43	1·13
State Farms, &c.				
Gatton College ...	4·48	14	2·42	5·40
Gindie	3·82	13	0·06	2·66
Kamerunga Nurs'y	17·98	23	2·73	28·97
Kairi	...	...	3·96	11·05
Sugar Experiment Station, Mackay	14·70	16	...	24·88
Bungeworgorai ...	...	...	0·27	0·92
Warren	...	...	2·08	0·75
Hermitage ...	2·71	7	1·92	1·41

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

Bracewell, Mount Larcom, rainfall for January, 1915, 3·00 in.

The tropical disturbance which occurred off the Queensland coast between 9th and 11th February last resulted in the following very heavy rainfalls, especially in the Southern Coast Division:—

CENTRAL DIVISION.

	Pts.		Pts		Pts.
Coastal—					
Emu Park	5	Mount Chalmers	11		

SOUTHERN DIVISION.

Coastal—		Hillview	154	Tiaro	305
Brisbane	552	Howard	407	Toogoolawah	412
Bundaberg	603	Ipswich	312	Wallaville	92
Beaudesert	269	Isis Junction	371	Wondai	222
Beenleigh	510	Kilcoy	580	Woodford	1,146
Biggenden	158	Kilkivan	212	Woody Island	280
Boonah	175	Kingaroy	215	Woolooga	360
Booval	340	Laidley	239	Wooroolin	230
Burnett Head	272	Landsborough	1,095	Yandina	765
Bustard Head	2	Laravale	247	Yimbun	505
Cape Moreton	662	Lowood	386		
Caboolture	902	Many Peaks	43	Darling Downs—	
Caboonbah	441	Mapleton	1,275	Allora	21
Caloundra	681	Marburg	340	Bell	78
Camboon	2	Maryborough	370	Cambooya	65
Cleveland	772	Moore	465	Clifton	19
Colton	460	Mount Crosby	430	Dalveen	3
Childers	230	Mount Morgan	2	Dalby	61
Cooroy	783	Mount Perry	150	Emu Vale	25
Cowan Cowan	870	Mungar Junction	406	Gowrie Junction	100
Crow's Nest	287	Murgon	200	Greenmount	52
Degilbo	123	Nambour	866	Jondowaie	1
Double Island Point	202	Nanango	205	Jimbour	9
Dunwich	864	Nerang	495	Jondaryan	49
Eidsvold	19	Oxenford	580	Killarney	15
Engelsburg	240	Palmwoods	1,170	Kuvura	16
Ernest Junction	440	Petrie	1,041	Malakoff	55
Esk	465	Pialba	408	Meringandan	155
Eumundi	765	Rockhampton	1	Oakey	72
Forest Hill	196	Rathdownie	140	Pittsworth	36
Gatton	258	Redbank	284	Spring Bluff	190
Gin Gin	65	Redcliffe	940	Toowoomba	153
Gladstone	12	Rosedale	62	Warwick	5
Goodwood	465	Rosewood	290	Yangan	26
Gayndah	65	South Passage	829		
Grandchester	270	Southport	300	Maranoa—	
Gundiah	335	St. Helena	997	Roma	14
Gympie	532	Tallebudgera	430	St. George	5
Harrisville	209	Tewantin	562	Wallumbilla	8
Helidon	200	Theebine	635		

METROPOLITAN.

Annerley	521	Goodna	375	Pinkenba	715
Ascot	694	"Huntingtower"	560	Rocklea	535
Bald Hills	954	Indooroopilly	503	Sandgate	960
Boggo Junction	530	Manly	870	Sunnybank	514
Botanic Gardens	593	Mayne Junction	700	Taringa	253
"Chiefswood"	570	Milton	565	Toowong	510
Coorparoo	572	Murarrie	720	Wynnum	735
Enoggera Rly. Sty.	652	Newmarket	550	Yeerongpilly	519
Enoggera Reservoir	647	Nudgee College	1,029	Zillmere	815
Gold Creek Reservoir	697	Nundah	795		
		Oxley	454		

Tropical Industries.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following monthly report from the Acting Entomologist to the Bureau (Mr. E. Jarvis):—

FIELD WORK.

At the beginning of this month beetles emerged in sufficient numbers to make it worth while commencing observations relative to their movements at night time, principally with a view to testing the influence of artificial light of various colours on the adult female of albohirta.

Arrangements had previously been made to conduct these experiments at the Carrah Estate, Gordonvale, the manager of which, Mr. J. H. Greenaway, kindly offered to render any assistance in his power.

I was at first disposed to think that ordinary white light might prove disappointing, some entomologists being of opinion that it exercises little or no impression on this particular cane beetle, although it is undoubtedly attractive to related species of the genera Anoplognathus, Xylotrupes, &c. It was decided, nevertheless, to commence experimentation with the flame of an acetylene hand-lamp fitted with a burner of 28 litres capacity, placed in a beetle-trap specially designed by the writer for this branch of control. On the 5th instant, the trap was accordingly installed among young plant-cane, and the light directed towards scrub land about 100 yards distant, but beetles were evidently very scarce as only three were caught on this date and seven during two succeeding evenings. On the 9th and 11th instant, however, a few heavy showers fell, establishing soil conditions conducive to freer emergence of the beetles, and it was then that definite results were obtained, conclusively proving our grey-backed cane-beetle (*Lepidiota albohirta*) to be strongly attracted to white light. The following table recording observations during three successive evenings is not without interest:—

SKY CLEAR; NO WIND; NO MOON.			LEPIDIOTA ALBOHIRTA.		
Date.	Average Temperature.	Hours.	Beetles Caught.	Male.	Female.
14 December	76° F.	8 p.m. to 11 p.m.	51	40	11
15 ,, ..	76° F.	8 ,, 9 ,,	57	46	11
16 ,, ..	77° F.	8 ,, 10 ,,	62	45	17
			170	131	39

Other influencing meteorological conditions are omitted here for the sake of brevity, but it may be mentioned that on the 16th (when sixty-two specimens were captured) the trap was faced towards the centre of the field away from feeding trees with the object of attracting beetles that might be emerging among the cane. It was remarked that although they started to fly when the lamp was lighted at about 7.20 p.m., the first specimens entered the trap on each of these evenings exactly at 8 o'clock, from which we may infer that albohirta does not readily respond to the influence of artificial light until the last signs of day have faded and been replaced by a certain degree of darkness. The above habit has a practical bearing on this form of control, and will receive further investigation.

Having obtained satisfactory proof of the attractiveness of artificial light, the movements and flight of the beetles whilst under its influence were carefully studied, this being an important consideration, seeing that no form of light-trap can be of much use unless constructed with view to taking full advantage of the mode of approach manifested on such occasions.

It is unnecessary at present to allude in detail to these observations, but I feel sure that comparative failure during past years has been mainly due to lack of this essential knowledge. Certain practical conclusions were arrived at regarding the kind of design best calculated to produce a really serviceable trap, and the precise conditions under which such a trap might reasonably be expected to achieve payable results. It is but fair to state that the total figures tabled above represent only six hours' catch, and would doubtless have been higher had the the experiment on each evening been prolonged throughout the night; moreover, the single trap used scarcely illuminated one cardinal point of the compass, and it was believed that the beetles had not appeared in full numbers. It will be interesting to note during future research whether a few days' exposure to the sun whilst feeding renders adults of this species indifferent to the influence of artificial light. I am inclined to believe that under favourable circumstances reaction towards the latter is likely to be continuous, but in any case they are certainly susceptible during their first flight immediately after leaving the soil, and if captured at that time oviposition is prevented.

Unfortunately the measure of success obtainable by light-traps is determined by prevailing climatic and other conditions, the beetles at times being disinclined to fly for perhaps several consecutive nights, and then suddenly appearing on the wing in vast numbers.

Knowledge of this fact, however, need not deter us from attempting to utilise a method of control which, practised systematically, can hardly fail to be remunerative on badly infested areas. It would be a simple matter to compile a table of directions based on reliable data from which farmers could tell at a glance when to use such traps, and so be saved the time and expense of lighting them to little or no purpose.

These investigations, and others of more importance, relative to the control of this insect during its adult stage, will be continued as long as the beetles are in evidence.

LABORATORY NOTES.

Recent experimental work with the Samoan fungus (*Metarrkizaim anisophioc,* Metsch) has resulted in a 50 per cent. infestation of grubs of our cane-beetle (*Lepidiota rothai*) after a period of twenty-eight days, the first larva being killed and covered with fungus spores nine days after infection, and others succumbing to its attacks a fortnight later.

Young larvae of albohirta will be procurable in about five weeks, when it is hoped to commence a series of experiments similar to the above, to be continued throughout the larval stage of this species.

Methods of infection proving successful in the laboratory will, if possible, be tested in the field at a time of year when weather conditions are propitious to a speedy development of fungus diseases.

Referring very briefly to the work of breeding and studying life-histories of economic insects of sugar-cane, I may mention that during the past month adults of four additional species of lepidopterous insects not hitherto recorded have been reared from larval forms.

Three of these butterflies, of minor importance, belong to the family Hesperidæ, the caterpillars of which were found destroying foliage of cane plants near Babinda and at Gordonvale; while the fourth is a most interesting moth-borer, not yet identified, that was observed tunnelling the centre of young shoots of ratoon cane on a plantation at Mount Pyramid, occasioning injury identical in character to that caused by our noctuid moth-borer (*Phragmatiphila truncata,* Hamps).

RECORD SHIPMENT OF BUTTER.

By the s.s. "Carpentaria," which left Brisbane on the 12th February for London, there were despatched 35,953 boxes of butter, all of which had been inspected and passed for export by officers of the Department of Agriculture and Stock. This constitutes the largest shipment of butter which has yet been despatched in one ship, and represents 2,013,368 lb.

A VALUABLE COW.

What is claimed to be the champion dairy cow of the world was sold recently in the United States for £1,020, which is believed to be the highest price ever paid for a dairy cow. This cow, Mayrilma—a Guernsey—has a yearly record of 19,673 lb. of milk, containing 1,073 lb. of butter fat.

Plant Pathology.

PINEAPPLE CULTIVATION.

The following report on " Alleged Diseases in Pines at Woombye" was received during last year by the Under Secretary for Agriculture and Stock from Mr. H. Tryon, Government Entomologist and Vegetable Pathologist. It will serve to allay any fears which some pineapple growers entertain as to the presence of supposed disease in the plant:—

1. In prosecuting the investigation the pineries of the following growers claimed attention:—Messrs. Blagden, Clayton, Collier, H. Davis, S. Davis, F. Fairley, J. Foote, W. Furlong, Garrod, Innes, R. Kerr, Kerslake, A. G. Reynolds, J. Rose, senr., C. Rose, Skene, Southwick and Sons, T. Smith, C. T. Whittaker, and Wilks; the several plantations referred to ranging from 35 acres to ½ acre in extent.

2. As, generally speaking, they were kept in a clean condition, and occupied sloping ground so as to be seen individually from many vantage points, a satisfactory general inspection was practicable without the long expenditure of time, beyond that mentioned; at the same time these features would especially conduce to the discovery of any abnormal state of growth if present.

3. As the outcome of this inquiry, it was found that almost without exception (*vid.* paragraph 9) the rows of plants exhibited a remarkably uniform, even, and vigorous condition, and elsewhere where evenness had not characterised their appearance, this was traceable either to a relatively inferior character of soil or defective cultivation (*vid.* paragraph 11).

4. In explanation of this favourable state of things, it may be mentioned that these soils reposing on gentle slopes conduce to effective aeration and drainage, and although evidently varying in fertility within small limits, were on the whole remarkably alike in texture, being " warm," free sandy loams—such soils indeed as prove congenial to the plant in question wherever my extended observations have shown that it is grown successfully.

5. On traversing the different plantations the conclusion derived from a general survey was sustained on examination of individual rows and their component plants; no instance of disease—of insect or fungus origin—claimed attention, but notwithstanding there were grounds for concluding that Mealy Bug (*Dactylopius Droncliae*) was present sporadically in small amount.

6. As evidence in support of this finding, all the growers interrogated appeared satisfied with their circumstances and prospects, holdings had recently changed hands at improved values, areas under cultivation were being increased, and both yield and prices were being maintained.

7. Previous to the inquiry, it had been brought under notice that the behaviour of pineapple plants derived from a Woombye farm and grown in another district had led it to be inferred that they were infected with some disease that occurred on this farm at the time when they were received, and such an explanation might seem quite plausible when no other one of the occurrence was conceived; but the outcome of an examination—in the course of this inquiry—of the pineapple cultivations on the farm in question, and even of the bed of these plants, whence, as it was stated, the suckers referred to had been derived, was to show that it was untenable. For, as a matter of fact, not only was no disease discoverable, or evidence of the presence of one existing in the past forthcoming, but the grower himself was actually, at the time of our visit, using—as was pointed out—plants from the very source that was under suspicion, for increasing the area of his own cultivation; and these, moreover, I found to be quite healthy.

8. With respect to a second farm, it was pointed out by local pineapple growers that an instance of failure was afforded by pineapple plants growing in a small area amongst such as were apparently quite healthy, and that immediately surrounded them; and that this occurrence had already been brought under the department's notice by its proprietor. This failure I found, as alleged, to be quite local, in a cultivation of several acres in extent, where the pines were characterised by vigour and healthiness. Evidently, too, that it was a case of root-poisoning, and therefore not a disease proper. Also that the plants implicated had grown normally, and in many cases produced fruit immediately before their decadence had commenced. In explanation of this very exceptional occurrence, as regards the Woombye district and its pineries, it was noted that immediately above the small area occurred a stratum of impervious clay (such as is occasionally seen interstratified with the Ipswich sandstone, the geological formation of the district) that traversed almost horizontally the small hill, in one slope of which the plants grew, near its summit, and indeed virtually formed a basin-like receptacle for the "drainage." On the heavy rainfall being experienced that had preceded the incident under consideration, the accumulated stagnant water had obviously overflown and percolated through the soil beneath, and, spreading out in a fan-like manner as it progressed, had come in contact with the roots of the plants in this area affected, had injured these, and so with their destruction the plants themselves had gradually ceased to grow or even died—with top rot as a symptom.

9. Such an occurrence might have been repeated whenever analogous conditions of the land occurred, but a second one did not come under notice. However, a clay band was seen outcropping in land destined for an additional pinery, and the proprietor shown how to drain off the poisonous ferruginous water which issued where this was so, as had been already the pineapple grower above alluded to.

10. Another cultivation—a very small one, with respect to which a distant prospect suggested disease occurrence—was also visited. Here it was found that the land had never been properly tilled, or even broken up by a plough or spade; and that in places, accordingly, such friable soil as had occurred superficially had almost entirely been removed by surface drainage. As a result, the plants included in this area were small and depauperated, but though at a standstill as regards growth, were otherwise perfectly healthy.

11. Having witnessed elsewhere the effects of disease in seriously injuring pineapple cultivation, and in bringing this local horticultural industry to a standstill, where indeed not rendering it wholly impracticable, I ventured to counsel those growers I met, and pointed out to them the imperative obligation they were under to maintain their plantations in the healthy condition in which I had found them, and to avoid, therefore, as far as possible all risks of introducing disease that was inseparable from the admission of further pineapple plants from without; but, rather, having already in their possession a good and profitable plant, to render it still better by the adoption of the most approved methods of horticultural practice as applied to the pineapple. And that the condition of the Citrus cultivation of the district, the outcome of a diametrically opposite policy being pursued, was a striking object lesson pointing to the expediency of compliance in this respect with my teaching.

WOOL GROWN ON THE COAST.

Mr. Alec Hay (Coolangatta) writes:—"Your report of the wool sales on the 12th instant records the fact that 7,287 bales were sold, including private transactions. The highest prices reported were as follows:—New Zealand Loan, 6 bales at 13d.; Australian Mortgage, Land, and Finance Company, 8 bales at 13¼d.; Australian Mortgage, Land, and Finance Company, 9 bales at 13¼d.; Winchcombe, Carson, and Co., 7 bales at 13½d.; Winchcombe, Carson and Co., 7 bales at 13d. The Coolangatta Estate forwarded to this sale 83 bales, 43 of which were sold at 12¾d.; so that out of this large catalogue of 7,287 bales, only 37 bales beat the coastal grown wool. Messrs. Schute, Bell's report of 5th November, 1907, states:—'A. Hay, Coolangatta, 16 bales 14d., 11 bales 13½d., good, useful quality, dry condition, fair length'; this being the top price obtained at the sale. The wool sold on the 12th instant was grown on the same indifferent coastal country as that sold in November, 1907, with a frontage to the ocean from the Crookhaven River to the north head of Jervis Bay, and it has been continuously used for sheep for the past ten years, and most of the wool recently sold is from locally-bred sheep. There are many millions of acres along our seaboard of far superior quality to the land used in the present instance, and more adaptable to sheep and wool growing, yet one hears repeatedly the old fallacy that coastal lands are unsuitable for sheep. It might be interesting to the public if some of our experts would take the trouble of reporting on this question and the suitability of the coastal country, and so enlighten those who would, if certain of the results, take up and improve some of this cheap land for the production of crossbred wool."—"Sydney Morning Herald," 17th February.

[The above fully bears out the contention of the Queensland sheep and wool expert, Mr. J. G. Brown, that our coastal lands are perfectly suitable for sheep raising, right down to the sea shore, provided the right breed be selected, and proper attention be given to the flocks.—Ed., "Q. A. J."]

Answers to Correspondents.

PROPAGATION OF TAMARIND SEEDS.

"TAMARIND SEEDS," Mullet Creek—

1st. Seeds may be planted from September to February inclusive. If planted during the cooler months some protection should be afforded for the young seedlings.

2nd. It is advisable to sow the seeds in a well-prepared bed or in boxes, and transplant during moist weather when the seedlings are a few inches high. If only a few trees are required the seed may be sown in permanent positions where they will grow quicker if protected from injury.

3rd. A good sandy loam is preferable, but they will grow in a wide range of soils.

4th. The period before bearing varies in different localities (about five years).

5th. Little or no pruning is required except thinning out crossing or crowded branches and keeping a symmetrical shape.

PRUNING OF MULBERRY TREES.

A. H. HAVELL, Wondai—

The fruit is produced on the young wood of the previous summer's growth. About one-third of each shoot should be pruned off during winter. The remaining wood will produce finer fruit. Prune out crossing or crowded wood and keep your tree in good shape. Judicious pruning improves all trees.

REMEDY FOR WORMS IN MARES.

Worm powders, containing sulphate of iron 6 oz. and tartar emetic 2 oz.; the ingredients to be thoroughly mixed together and made into twelve powders, one to be given daily in food. This will hurt neither mare nor foal.

DEATH OF PIGS.

From the symptoms described, it appears that the animals are suffering from pneumonia. Cement floors are not so good for pigs as wooden ones. Pigs should always be kept dry and sheltered from wind and rain, as they are very susceptible to cold and pneumonia. Prevention in this case seems to be what is required. One drachm nitrate of potash and 1 drachm chlorate of potash should be given twice daily to each pig to relieve the cough.

HORNY FORMATION ON COW'S BRAND.

Wash the wound thoroughly three times daily with warm water, and afterwards dress with boracic acid.

HOVEN.

From the symptoms described the animal is suffering from Hoven. Probably the food he is getting does not agree with him, and it would be advisable to change his diet. In the meantime, ½ lb. Epsom salts with ½ lb. treacle should be given, followed twice daily by 1 oz. bi-carbonate of soda dissolved in half a pint of tepid water.

HARVESTING COWPEAS.

Cut for hay when the crop is beginning to pod. Put the vines in cocks shortly after harvesting, otherwise the leaves will drop off.

TAMARINDS.

1. The best time to sow tamarinds is from September to February inclusive. If planted during the cooler months some protection should be afforded to the young seedlings.

2. It is advisable to sow the seeds in a well-prepared bed or in boxes, and transplant during moist weather when the seedlings are a few inches high. If only a few trees are required, the seed may be sown in permanent positions, when they will grow quicker if protected from injury.

3. A good sandy loam is preferable, but tamarinds will thrive in a wide range of soils.

4. The bearing period varies in different localities (about five years).

5. Little or no pruning is required except thinning-out crossing or crowded branches, and keeping a symmetrical shape.

COTTON.

R.J.H., Diddillibah—

The sample of cotton submitted is a tree cotton (perennial), apparently a Caravonica or Sea Island.

The demand for the latter is limited, and it is not advisable to grow it largely in Queensland, notwithstanding that, previous to the war, good Sea Island was worth from 15d. to 20d. per lb. ginned.

At present cotton is very low priced in the home market, Upland being worth barely 5d. per lb., and all the Sea Island cotton needed can be grown in the United States; 1½d. per lb. is paid by the Agricultural Department for seed cotton, and any profit made, after ginning, freight, and other expenses have been deducted, is handed to the seller.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1915.

Article.		FEBRUARY. Prices.
Bacon	lb.	11½d.
Bran	ton	£9 5s.
Butter	cwt.	124s. to 130s.
Chaff, Mixed	ton	£5 5s.
Chaff, Oaten	,,	£7 to £7 10s.
Chaff, Lucerne	,,	£4 to £5 10s.
Chaff, Wheaten	,,	£4
Cheese	lb.	7½d. to 7¾d.
Flour	ton	£13
Hams	lb.	1s. 2d. to 1s. 3½d.
Hay, Oaten (Victorian)	ton	£9 10s.
Hay, Lucerne	,,	£5
Honey	lb.	2d. to 3d.
Maize	bush.	4s. to 4s. 2d.
Oats	,,	3s. 6d.
Onions	ton	£12 to £13
Peanuts	lb.	3d.
Pollard	ton	£9 10s. to £10
Potatoes	,,	£5 to £6
Potatoes (Seed)	,,	£8 to £13 10s.
Potatoes (Sweet)	cwt.	3s. 9d. to 4s.
Pumpkins	ton	£3 10s.
Wheat, Milling	bush.	6s. 2d.
Eggs	doz.	10d. to 1s. 3d.
Fowls	pair	3s. 9d. to 5s.
Geese	,,	4s. 9d. to 5s. 9d.
Ducks, English	,,	2s. 6d. to 3s. 3d.
Ducks, Muscovy	,,	4s. to 5s. 6d.
Turkeys (Hens)	,,	8s. 6d.
Turkeys (Gobblers)	,,	16s.

VEGETABLES.

Cabbages	per dozen	1s. 6d. to 4s. 6d.
Beans	per sugar bag	1s. 6d. to 4s.
Peas	,,	4s. to 7s.
Cucumbers	per dozen	3d. to 6d.
Custard Marrows	,,	4d. to 9d.
Vegetable Marrows	,,	1s. to 2s.
Tomatoes	per quarter-case	1s. to 4s.

SOUTHERN FRUIT MARKETS.

Article.	FEBRUARY. Prices.
Bananas (Queensland), per case	5s. to 10s.
Bananas (G.M.), per case	21s. to 22s.
Bananas (Fiji), per case	18s. to 20s.
Mangoes, per case	4s. to 10s.
Oranges, per case	5s. to 9s.
Passion Fruit, per half-case	2s. to 4s.
Papaw Apples, per half-case	6s. to 10s.
Pineapples (Queens), per case	6s. to 8s.
Pineapples (Ripleys), per case	4s. to 6s.
Pineapples (Common), per case	4s. to 6s.
Tomatoes, per quarter-case	3s. to 5s.
Rockmelons, per double case	3s. to 5s.
Watermelons, per dozen	4s. to 12s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	FEBRUARY. Prices.
Apples (American), Eating, per case	12s. to 13s.
Apples (Local), per case	2s. 6d. to 5s. 6d.
Apples Cooking, per case	3s. to 5s.
Apricots, per quarter-case	...
Bananas (Cavendish), per dozen	2d. to 3d.
Bananas (Sugar), per dozen	$1\frac{1}{2}$d. to 2d.
Cape Gooseberries, per quarter-case	...
Cherries, per quarter-case	...
Cocoanuts, per sack	12s. to 15s.
Cumquats, per case	...
Custard Apples, per quarter-case	...
Lemons (Local), per case	3s. to 7s.
Lemons (Lisbon), per case	6s. to 7s.
Limes, per case	...
Mandarins, per half-case	8s.
Mangoes, per case	1s. to 4s.
Nectarines, per quarter-case	1s. to 3s.
Oranges (Japanese Navel), per case	20s.
Oranges (other), per case	20s.
Papaw Apples, per quarter-case	9d. to 1s. 6d.
Passion Fruit, per quarter-case	1s. 9d. to 3s. 6d.
Peaches, per quarter-case	1s. to 3s.
Peanuts, per pound	3d.
Pears (Victorian William), per case	6s. to 8s.
Persimmons, per quarter-case	1s. 9d. to 3s.
Pineapples (Ripley), per dozen	1s. 3d. to 3s.
Pineapples (Rough), per dozen	4d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 3s. 6d.
Plums, per quarter-case	2s. 6d. to 4s.
Rockmelons, per dozen	3s.
Rosellas, per sugar bag	...
Strawberries, per tray	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	6d. to 1s.
Watermelons, per dozen	1s. to 1s. 6d.

TOP PRICES, ENOGGERA YARDS, JANUARY, 1915.

Animal.	JANUARY. Prices.
Bullocks	£16 to £17 17s. 6d.
Bullocks (single)	£25 5s.
Cows	£10 5s. to £14 10s.
Cows (single)	£17 2s. 6d.
Merino Wethers	22s. 3d.
Crossbred Wethers	22s. 9d.
Merino Ewes	20s. 3d.
Crossbred Ewes	21s. 6d.
Lambs	20s.
Pigs (Bacon)	...
Pigs (Porkers)	30s.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

Date.	January.		February.		March.		April.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·57	6·45	5 22	6·42	5·42	6·19	5·58	5·45
3	4·58	6·46	5·23	6·41	5·43	6·18	5·59	5·44
4	4·58	6·46	5·23	6·41	5·44	6·17	5·59	5·43
5	4·59	6·47	5·24	6·40	5·45	6·15	6·0	5·42
6	4·59	6·47	5·24	6·40	5·45	6·14	6·0	5·41
7	5·0	6·47	5·25	6·39	5·45	6·13	6·1	5·40
8	5·1	6·47	5·26	6·38	5·46	6·12	6·1	5·39
9	5·2	6·47	5·27	6·37	5·46	6·11	6·2	5·38
10	5·3	6·47	5·28	6·36	5·47	6·10	6·2	5·37
11	5·3	6·47	5·29	6·36	5·47	6·9	6·3	5·36
12	5·4	6·47	5·30	6·35	5·48	6·8	6·4	5·34
13	5·5	6·47	5·30	6·34	5·48	6·7	6·4	5·34
14	5·6	6·47	5·31	6·34	5·49	6·6	6·4	5·33
15	5·7	6·47	5·32	6·33	5·49	6·5	6·5	5·32
16	5·8	6·47	5·33	6·32	5·50	6·4	6·5	5·31
17	5·9	6·47	5·34	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·51	6·2	6·6	5·29
19	5·11	6·46	5·35	6·29	5·52	6·0	6·7	5·28
20	5·12	6·46	5·36	6·28	5·53	5·59	6·8	5·27
21	5·12	6·46	5·36	6·28	5·53	5·58	6·8	5·26
22	5·13	6·45	5·37	6·27	5·53	5·57	6·9	5·25
23	5·14	6·45	5·37	6·26	5·54	5·56	6·9	5·24
24	5·15	6·45	5·37	6·25	5·54	5·55	6·10	5·23
25	5·16	6·44	5·38	6·24	5·54	5·54	6·10	5·22
26	5·16	6·44	5·38	6·23	5·55	5·53	6·11	5·21
27	5·17	6·44	5·39	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5·56	5·51	6·12	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·57	5·49	6·13	5·18
31	5·21	6·43	...	...	5·58	5·48	...	...

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H.	M.
1 Jan.	○	Full Moon	10	20 p.m.
9 ,,	☽	Last Quarter	7	12 a.m.
16 ,,	●	New Moon	12	41 ,,
23 ,,	☾	First Quarter	3	32 p.m.
31 ,,	○	Full Moon	2	41 ,,

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

7 Feb.	☽	Last Quarter	3	11 p.m.
14 ,,	●	New Moon	2	31 ,,
22 ,,	☾	First Quarter	12	58 ,,

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

2 Mar.	○	Full Moon	4	32 a.m.
8 ,,	☽	Last Quarter	10	27 p.m.
16 ,,	●	New Moon	5	42 a.m.
24 ,,	☾	First Quarter	8	48 ,,
31 ,,	○	Full Moon	3	38 p.m.

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

7 Apr.	☽	Last Quarter	6	12 a.m.
14 ,,	●	New Moon	9	36 p.m.
23 ,,	☾	First Quarter	1	39 a.m.
30 ,,	○	Full Moon	12	19 ,,

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.

2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.

3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.

4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat Mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will now be ready for a first or second hilling up. The last of the maize crop will now have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slacked off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is

useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Instead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

Kitchen Garden.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

Flower Garden.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, penstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. III. APRIL, 1915. PART 4.

Agriculture.

FARMING AT COOPER'S PLAINS.

Although many of our experienced farmers, men who have made a success of farming and dairying on rich scrub land or the fat black soils of the plains, are good examples for new chums to follow, the former are often prejudiced against farming in localities where the soil is not so rich as in their own districts, and when applied to for advice are in the habit of affirming that the "new chum" can "save himself the trouble of clearing that land, as it won't grow anything; the land is sour, too poor," etc., etc. Such was the statement made to two enterprising selectors, Messrs. Brown and Tait, who are farming 43 acres on Acacia Ridge, Cooper's Plains. In their own words:—" Proverbial new chums that we are, and both hailing from that little country called Scotland, we paid little attention to the advice given us by our neighbours, who, by the way, have been resident in the district, in some cases, for thirty or forty years, but laboured and persevered with our clearing, and we have now the satisfaction of knowing that our selection will grow, and that very successfully, many useful crops, as the following will prove:—We started off with planting 1,000 pineapple suckers in August, 1914, but, as you know, these take some time to mature so we cannot say what the ultimate result will be. We are, however, quite pleased with the progress they have made since they were put in, so much so that we are going to plant another 1,000 suckers next month if we can get the kind we desire.

"In September last we sowed patches of the following:—Pumpkins, marrows, beans, cucumbers, rock melons, and water melons, notwithstanding the dry spell. We had to give them a start off, and they did exceptionally well. We pulled one of the water melons yesterday and had it weighed at the store, and it turned the scale at 27 lb. The others are practically the same size, but not quite ripe.

"The small patch of maize which we sowed at the beginning of November has, in our estimation, done exceedingly well. In height a good many of the stalks measure 10 ft., while others are 10 ft. 2 in. The cobs are also fairly big, and, in some cases, as many as three and four on one stalk."

HINTS FOR WHEAT-GROWERS.

STORAGE OF GRAIN.

One of the most effective methods of overcoming weevil attack in grain is to fumigate in air-tight tanks with bisulphide of carbon. This liquid should be placed in saucers on top of the grain, and the lid of the tank or other apertures subsequently made air-tight with clay or other easily removable plastic.

The customary dose works out at 1 oz. of bisulphide to 6¼ bushels of grain, or 1 lb. to every 100 bushels of grain. This substance should not be brought into proximity with a lighted pipe or any form of fire. The tank should be opened about twenty-four hours after the bisulphide has been put in, to allow the fumes to disperse, then the lid may be put back.

If weevils have been present in grain, a second fumigation, about three weeks after the first, is necessary. Bags which have once contained salt are very useful to protect grain from the incursions of insects.

HARVESTING MACHINERY.

Choice of machinery for harvesting will depend a good deal of the growth made by the crop and its condition. It may be readily understood that when the wheat is lodged it will be very difficult to harvest by means of a stripper. Again, in moist, cloudy weather, stripping is an unsatisfactory method of harvesting. Inquiry should be made by you as to the class of machine available for the purpose, as the purchase of one for the limited amount of crop you intend putting in would not be justified.

TIME FOR SOWING.

The second to third week in May may be stated as a general period for sowing what are termed "mid-season" wheats. Winter wheats of the Manitoba or Fife type should be planted about a month earlier, but this class of wheat is not recommended for your district; such are more suitable for the cooler parts of the State. Quick maturing wheats may be sown up to the first week in June. Pickling of the seed grain is essential in order to check "smut" and "bunt."

DIRECTIONS FOR PICKLING SEED WHEAT.

Formalin or bluestone may be used for pickling, and it is thought that the bluestone will be the most satisfactory for your purpose. Treatment of the seed is of no value for "rust."

Formalin Treatment.—Soak seed for two hours in a solution containing 1 lb of formalin (a 40 per cent. formaldehyde solution) in 50 gallons of water, and spread out to dry before use.

Bluestone Treatment.—Use wooden receptacles. Make up a 2 per cent. solution of bluestone (1 lb. to 5 gallons of water). Place seed in a loosely-woven sack; immerse for three minutes; lift out and drain. Pour grain into a similar class of sack and immerse in limewater (2 lb. to 10 gallons) for at least a minute; lift out and drain. Spread grain out in thin layers to dry. It may be bagged up and kept for some weeks before use, provided it is properly dried first.

Levers can be rigged up to handle grain, and other conveniences arranged where a quantity of seed wheat has to be pickled.

Another way to pickle wheat is to make up a solution at the rate of 1 lb. of bluestone to 1 gallon of water (10 per cent. solution). Spread the grain out on a wooden floor, sprinkle the solution over the mass, and keep shovelling the grain briskly over and over until it is thoroughly mixed and each grain is apparently damp; then dry grain thoroughly and bag up, or else dry sufficiently to put directly through drill when sowing. This method is not so satisfactory as the one previously described.

A RURAL INDUSTRY.

which might well be undertaken in Queensland is that of chicory growing. The root in is very great demand in Great Britain, and also locally, owing to the cutting off of supplies from France and Belgium, where it was always largely grown prior to the present war. Before this calamity overtook those countries the price of Belgian chicory was £7 5s. per ton f.o.b. Antwerp. To-day, Dutch chicory, f.o.b. Dutch ports, is quoted at £16 per ton for the dried roots. The wholesale price to retailers of manufactured chicory was £27 per ton, while now it is £45, and the price is still rising. How does this affect the Queensland farmer? The chicory plant will thrive here from south to north as a hardy annual, and will give in this State heavier crops than in Europe. The seed is sown in drills about 16 in. apart in August. Before the leaves cover the ground, the plants are thinned out, and the spaces between the rows should be well cultivated and kept clear of weeds. The plant has a thick, white, fleshy, tap-root, and thrives in any soil which will suit carrots, parsnips, arrowroot, etc. The roots are fit to be dug and dried in from five to six months, and the weight of the crop runs to about from 3 to 5 tons per acre. There are several varieties of chicory, the best being called the "White Loof"—white leaf—which forms a head much like that of the cos lettuce. It is also called the "large-rooted Brussels chicory," from its thick stubby root,

and is the most profitable variety to grow for admixture with coffee. The leaves make excellent fodder for cattle and sheep. To prepare the root for sale as a commercial chicory, the root is first cut into small pieces, dried in a kiln, and then roasted in revolving iron cylinders. The loss in weight by this process is from 20 to 30 per cent. During the roasting, 2 lb. of lard to every hundredweight of chicory are added to give it a lustre like that of coffee. The powder looks like ground coffee, and smells like liquorice. The crop is ready to dig in February, our hottest month. There is no more difficulty in growing chicory than in growing any other root crops, such as parsnips, arrowroot, or cassava.

Chicory used to be grown to some extent at Cairns, where it was sliced and dried in the sun, bagged, and sent South, where it was finally roasted and ground. There is a good market for it in the Southern States, and now that the devastation caused by the war has practically put an end to the cultivation of many crops—such as beetroots, chicory, flax, and others—in Belgium and France, it would seem that there is a good opportunity for Queensland farmers to enter upon chicory cultivation, and retain a business afterwards, which cannot but be profitable.

COTTON INDUSTRY IN TEXAS, U.S.A.

In May, 1914, a well-known cotton-grower and cotton ginnery proprietor of Childress, Texas (Mr. E. E. Wood), visited Queensland for the purpose of ascertaining the cotton-producing capabilities and climatic conditions of the State, with a view to returning, with a number of American cotton-growers, to enter on the industry on a large scale. Subsequently a communication was received by the Hon. W. H. Barnes, who at the time was Acting Premier of Queensland, from the then Prime Minister of the Commonwealth of Australia, the Hon. J. Cook, forwarding a letter written by the Acting British Consul at Galveston, Texas, U.S.A., furnishing replies to certain inquiries made by the Dominions Commission in regard to the cotton-growing industry in the United States. This information was published in the issue of the "Queensland Agricultural Journal" for March, 1914, to which those of our readers who are interested in the cotton industry are referred.

We lately received a letter from Mr. Wood, part of which reads as follows:—

"Under separate cover am sending you some papers that you may get a fair idea of conditions here, also some photos of the ginnery in operation. The large man (in the picture on the wagon) and his five sons are much interested in Queensland, and a fine family are they. Have ginned 80 to 150 bales cotton for him the past five years. He, like myself and others that would go, are tied to property that at the present cannot be changed for money or paper security. Notwithstanding the low price of cotton, the farmers in this country are in easy condition. The drop in the price of cotton from 13 cents to 6½ and 7 cents was a sore disappointment to the grower.

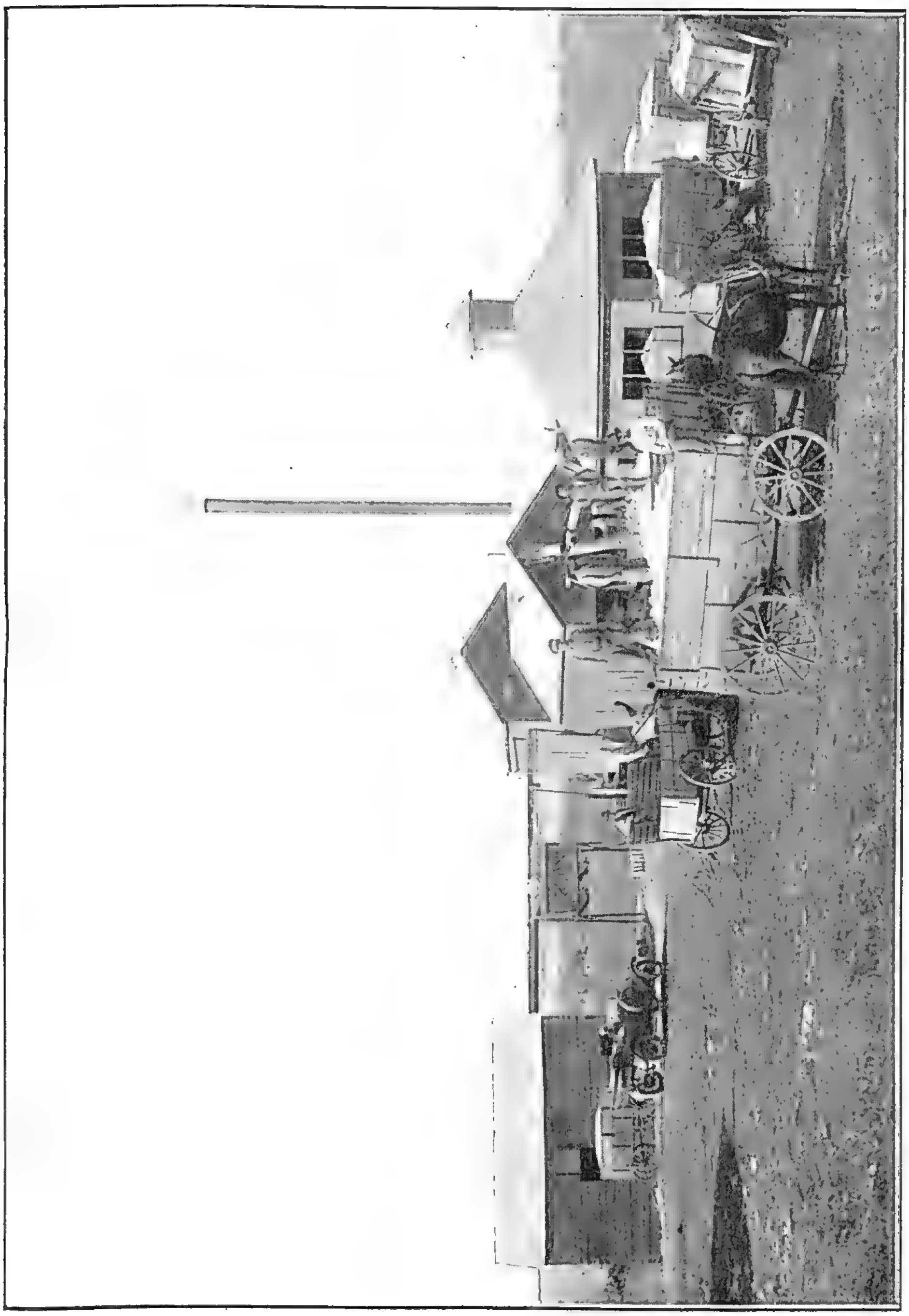


Plate 9.—Mr Wood's Cotton Ginnery, Childress, Texas, U.S.A.

"For cotton ginners it was a very profitable season, also for pickers. My plant has ginned 1,450 bales to 18th December—eighty days' operation.

"We have had bad weather since for ginning, the ground being covered with snow, and it looks like it will be March or April before the remainder (about 20 per cent.) of crop will be in.

"I believe I will be able to dispose of my gin property as it has shown to be a good money earner. My other property, land and city property (should I leave), would be unsold. War conditions have stopped investments in real estate, and money is available only for keeping business going. However, prospects are good (some say for boom) for better times ahead, but you know the majority of Americans are optimists.

"I started a cable to your Under Secretary for Agriculture in October, offering some good cotton seed cheap, but it was turned back at New York by the censor. Also it would have cost more money to take it through London. They only wanted twenty-five dollars! Cotton seed has more than doubled in price since, and it would now take from 1·25 (5s. 2d.) to 2.00 dollars (8s. 4d.) per bushel to get good seed. Gin-run seed about 40 cents (1s. 8d.) bushel. Queer these war lords can't read! By this time, I suppose, Australians have got over the shock and excitement of war and settled down to make a clean job of it.

"I enclose you letter received from chance acquaintance I made on train from 'Frisco home; he got the Australian fever from me. I wrote him back the war could not stop the world from going on, and that after it was over there would be millions of Europeans shifting to get away from after-war burdens, which are likely to be more unbearable than war itself.

"Should the Queensland Government organise and promote immigration along the lines of some of the large land companies (adding the cost of the service to land sold), there could be a good business from America.

"Cotton lands, no better than Darling or Peak Downs, are selling in Texas at 75·00 dollars (£15) to 150·00 dollars (£30) per acre. And there are thousands of tenants looking for the opportunity your country offers, but are too timid or not able to make the move. I hear of some scattered Australian travellers who would be glad to get back home."

The letter referred to by Mr. Wood was received from a large stock breeder in the United States (Mo.) who became very much interested in the former gentleman's enthusiastic account of the splendid stock-raising capabilities of Queensland, who would probably have been here now but for the war, which he thinks "will ruin the possibilities of Australia for a good few years to come."

PICKING RECORD IN TEXAS.

Reports of good picking by the boys are coming in right along. Dennis Sherrell, the eleven-year-old son of D. W. Sherrell, of Tell, picked 350 lb. of cotton in one day. Cotton is fine in every neighbourhood, and the ones who get up and go after it have no trouble in getting the big weighings.

Claudie Scarlet, a ten-year-old girl, picking cotton on J. H. Andrews's farm in Garden Valley, picked 506 lb. of cotton Monday. Miss Claudie weighs only 67 lb. This is a record hard to beat, and one the boys will have to work hard to overcome.

Here in the South our chief fear now is that the European savages will quit wearing clothes.

Pickers are paid one half-penny per pound. At this rate, a family of four pickers like Miss Scarlet could earn £4 6s. per day, whilst eleven-year-old Sherrell would add 14s. 7d. per day to the family income.

SUNFLOWER GROWING FOR SEED.

The sunflower will grow in almost any soil and in any climate. It will bear cold or heat, drought or rain. It is subject to no disease, and to no climatic disqualification. The cultivation is very simple. As stated, the plant is not at all particular, but prefers light, rich, well-drained soil. It is advisable to sow early—say, the beginning of September—to secure perfect maturity. The quantity of seed required per acre will vary from 4 to 6 lb. It should be sown in drills, 5 ft. between the rows, and the seed drilled or dibbled in at intervals of 3 ft. The plants may afterwards be thinned out, if found necessary owing to exuberant growth, to ensure full exposure to the sun—a very necessary condition. As the plants have a habit of spreading their branches and heads in successive layers over each other, thinning is generally necessary. When 12 in. high, a slight earthing up benefits the plants. Sunflowers with many heads do not ripen the seed evenly, therefore, it is better to cultivate a species producing only one large head to each plant.

The Tall Mammoth Russian is such a variety, and may be planted closer. It produces more seed than any other sort, and can be obtained from most seedsmen in Brisbane, and probably elsewhere.

A yield of 50 bushels per acre is not uncommon under favourable conditions. The Mammoth, or Giant Russian, has often produced flower heads 15 in. in diameter and bearing over 2,000 seeds.

The leaves of the sunflower, when sun-dried and pounded, and mixed with meal or bran, make good fodder for milch cows. The oil expressed is almost equal to olive oil.

We are not sure of the wholesale price now ruling for the seed; before the war it was quoted at £12 per ton.

Pastoral.

THE TAPE-WORM IN QUEENSLAND.

By W. G. BROWN, Sheep and Wool Expert

Recently, in the course of my duties, I have found that this season is remarkable for the extremly serious infestation of sheep by internal parasites. I am not able to explain why it is so. The plague is not confined to the coastal areas alone, but is found to be just as serious in the comparatively dry areas west of the Dividing Range, where only occasionally worms in sheep have given trouble in former years.

The main parasites, I find, are the stomach worm (*Strongylus contortus*), and in some places associated with these, the nodule worm (*Oesopagostoma Columbianum*). Of these two, much has been written of late years in Queensland.

The object of this article is to point out the presence in certain districts of the tape-worm (*Tænia expansa*) in addition to the other two.

I visited a group of sheep farmers a few days ago, and after inspecting the sheep concluded that they were suffering from stomach worms. I was, however, puzzled when I learned that the owners had thoroughly drenched these sheep only a few days before with a bluestone drench. Plainly there was no improvement, especially in the lambs, of which two had died overnight, in addition to others which had previously died. I then examined the droppings in the yard and found abundant evidence that tape-worms were present in very large numbers, and the puzzle was solved.

This evidence consisted, first, in the presence of small maggot-like, white pieces of matter which, under a magnifying glass, were seen to move slightly. Besides these, I saw one piece of a tape-worm about 10 in. long, which had broken off from the parent worm. Curtice, in his "Animal Parasites of Sheep," mentions that a tape-worm may be of any length up to 5 yards.

So it was clear that tape-worms and stomach worms together had invaded the flock under inspection. I drenched at once with arsenic and Epsom salts, and have reason to believe that most of the tape-worms were killed, for many were voided in the yards after drenching.

Owners of flocks on coastal areas, therefore, should be on the *qui vive* for this pest, and so that they shall know for what to look, I append some remarks by Curtice, with a group of illustrations by that author.

I have found the arsenical drench recommended by this Department effective against them (*see* Professor Curtice on the "Animal Parasites of Sheep," page 31).

"The tape-worm disease can be diagnosed by finding the little white, oblong tape-worms segments which are voided from the sheep, and stick to the pellets of dung. They may also be found adhering to the wool and dirt around the tail. But this is only after the tape-worms have become adult and have begun to shed segments. Though sheep often harbour tape-worms, and give no evidence of their presence until after slaughter, there are cases in which their presence is only too evident to the flockmaster. The first indications of the disease are usually unobserved, because of slow growth and the comparatively small number of parasites that may be developing. The time of growth occupies about two or three months from infection. The number of individuals may be from two or three to a hundred; but it is unusual to find more than half a dozen adults together. As many as fourteen adults have been found in a lamb four months old.

"When young the worm occupies but a small space, needs little food, and causes few vermicular contractions. In the earlier stages, it is plain that they cause but little trouble, but when they grow large they seem to fill the whole of the small intestines, and they cause the serious disturbances ascribed to them. These disturbances may be, to a certain extent, those arising from a reflex irritation of the sympathetic and spinal nerves, but most of them seem to arise from the indigestion which the worms produce.

"The worms obstruct the intestinal canal by their great mass, irritate it by their vermicular contractions, cause excessive secretion of the intestinal fluids, non-assimilation of food, and abstract nutriment from the intestinal contents for their own growth.

"The lambs become poor and hide-bound; their flanks may be either distended by gas or be tucked-up by gauntness. In the progress of the disease the animals become evidently weaker, the mucous membranes paler, and the fleece dry and harsher from the absence of yolk. The animals walk with a tottering gait. They often eat more and drink oftener than those less affected. In the severest cases the lambs grow weak and poor, diarrhœa becomes more and more pronounced, and at last they die through sheer exhaustion. While suffering from these worms they are more susceptible to the attacks of other parasites, while other diseases supervene and hasten the death of the otherwise weakened animals."

These are the words of one of the best authorities on intestinal parasites in the world, and nothing can be added to them.

I send this out because we want information as to the presence of any pest, and centralised information must result in good for the sheepmaster.

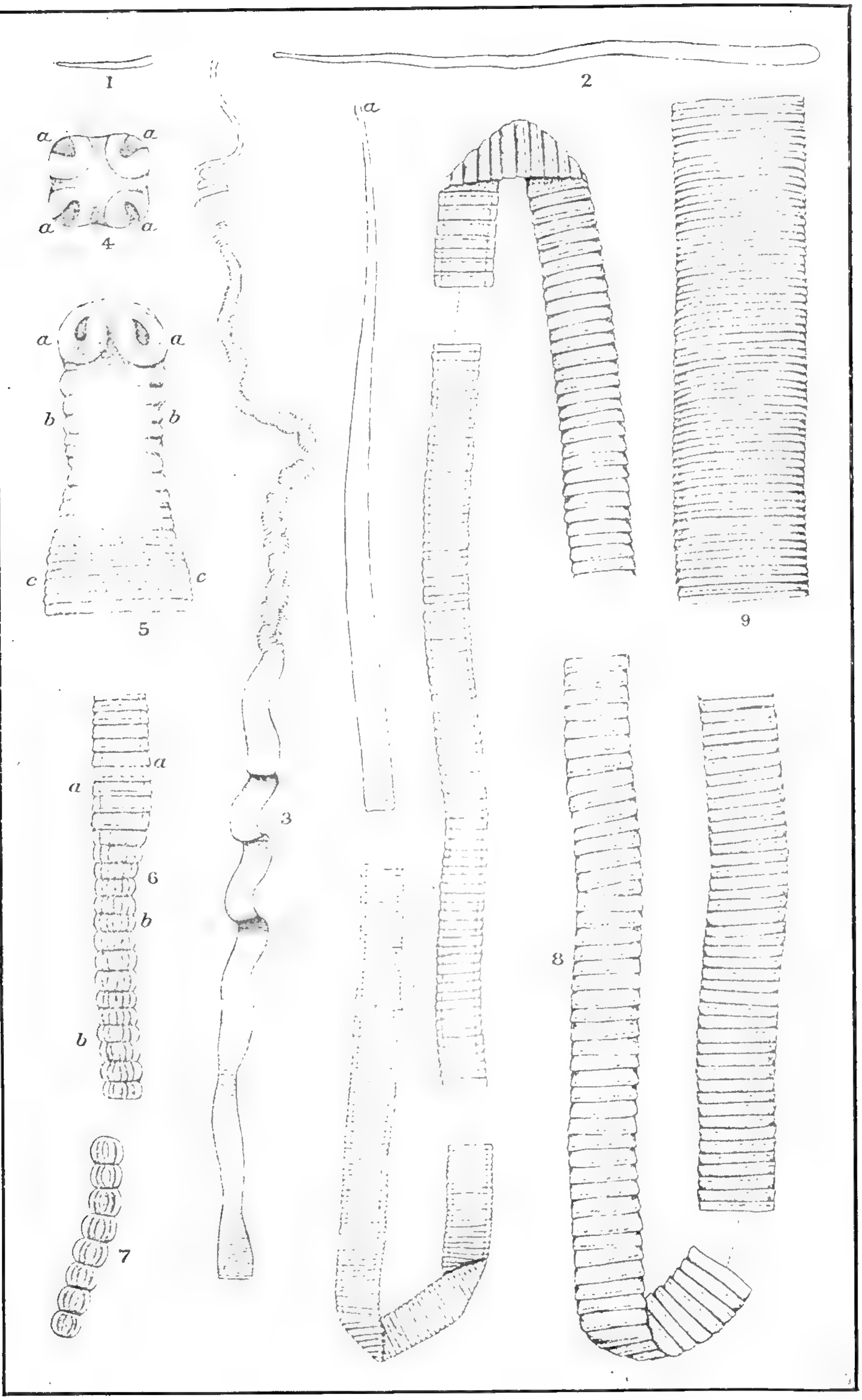


PLATE 10.—THE TAPE-WORM (*Tænia expansa*).

TÆNIA EXPANSA, Rod.

Figs. 1 and 2.—Young tape-worms, natural size.

Fig. 3.—Head end of tape-worm drawn to show vermicular contractions when living.

Fig. 4.—Head, top view: *a, a*, the *suckers* or *cups* by which the worm attaches itself to the intestinal walls.

Fig. 5.—Head, side view: *a, a, suckers*; *b, b, folds in the neck*; *c, c, the first segments.*

Fig. 6.—The large end of a young tape-worm: *a, a, segments which are not mature* enough to drop off; *b, b, segments ready to pass away* from the worm.

Fig. 7.—Segments or *proglottides* found separate from the worm.

Fig. 8.—An adult tape-worm drawn in sections at regular intervals apart: *a, head.*

Fig. 9.—A fragment of another worm which is not only slightly longer, but whose segments are shorter and broader.

The specimens shown in Fig. 8 could have assumed very much the same form when alive as in Fig 9.

ABERDEEN ANGUS CATTLE.

By P. R. GORDON.

In my contribution to your February issue on the subject of smaller grazing holdings, I instanced the Aberdeen-Angus cattle as one of the most profitable breeds to adopt on such holdings. That they are the ideal beef cattle is readily acknowledged by breeders of other beef varieties, and their most remarkable successes at all the leading fat stock shows of Great Britain and America, both before and after slaughter, is the strongest evidence of the fact. It is not intended in this short paper to go into the antiquity of the breed. That subject has been fully elaborated in Macdonald and Sinclair's interesting history of the breed, published in 1882. At what period in their history their horns disappeared is still matter of conjecture, but that they sprang from a horned variety is, in the opinion of naturalists, proved by the conformation of the skull. On that subject Darwin, the celebrated philosopher and naturalist, says it has been due to "what we may call, in our ignorance, spontaneous variation." The authors of the history referred to went into this branch of the subject at great length, and arrived at the conclusion that this beautiful race is a direct branch of the aboriginal horned cattle of Scotland thrown off by those sudden "proper," "spontaneous," or "accidental" "organic changes," and they go further and say the breed is indigenous to the very districts which still form its headquarters—the north-eastern counties of Scotland, with Forfar and Aberdeen as chief centres. The breed takes its sub-title from the old district of Angus, now mainly comprised in the county of Forfar, where they are known as "doddies," while in Aberdeen they are familiarly known as "humlies." A variety of polled cattle has existed in Aberdeen from time immemorial. Little attention had been given to the improvement of cattle till after the middle of the eighteenth century. It was about the year 1808 that Hugh Watson, of Keillor, in

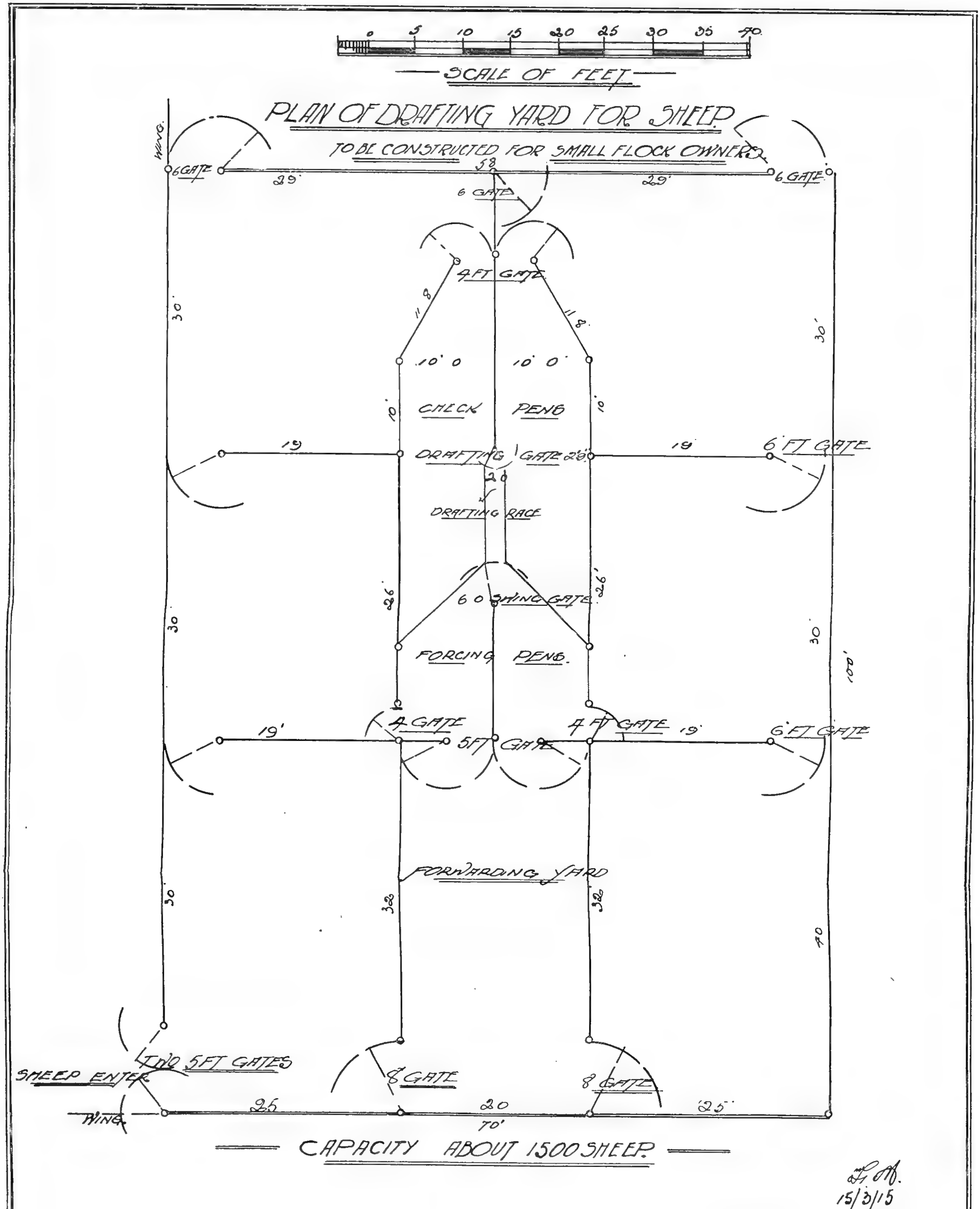
Forfarshire, commenced to improve the breed, and he in many ways resembled his great prototypes in the Shorthorn world, the brothers Colling, who had commenced the improvement of Shorthorns in 1780, just twenty-eight years before the famous Keillor herd was formed. In his work on "Cattle and Cattle Breeders," Mr. McCombie generously acknowledges that "among those who have distinguished themselves as breeders of Aberdeen and Angus polled cattle, the late Hugh Watson, of Keillor, deserves to be put in the first rank. We all look upon him as the first great improver, and no one will question his title to this distinction. There is no herd in the country which is not indebted to Keillor blood." His method of operations as an improver was similar to that of the first greater improvers of the Shorthorns—namely, "put the best to the best, regardless of affinity or blood." He bred from none but the best—that is, those that came nearest to his ideal—and he did not care whether these were closely related or not. The history of the time shows that many took up the breeding of the improved Aberdeen-Angus cattle, among the number being many who afterwards became famous as Shorthorn breeders. But after the fame of the improved Shorthorns, after Colling's great sale in 1810 (when Comet reached 1,000 guineas), Shorthorns were introduced in great numbers into Scotland, and the black polls receded into partial obscurity, and then it was discovered that the Shorthorn bulls mated with polled cows produced better butcher cattle than had yet been known—animals remarkable alike for aptitude to fatten, wealth of flesh, constitution, and quality of beef. Crossing in this fashion, therefore, became almost a craze; and this craze also invaded Angus, and there induced many farmers—much to their own chagrin afterwards—to allow their excellent herds of purebred polled cattle to degenerate into stocks of ever-varying crosses. Fortunately, however, in both the great strongholds of the breed there were a number of shrewd, far-seeing men who recognised the danger which threatened the native polled cattle, and who determined to disregard the popular taste, and to maintain more jealously than ever the purity of the polled race. It was then that the late Mr. William McCombie, of Tillyfour, Aberdeenshire, stood head and shoulders over all others as the great deliverer of the polled race. It is doubtful whether any other single individual has ever done more to improve and popularise any breed of live stock than Mr. McCombie did to improve and make known his pet polled cattle. Taking up the work so systematically commenced by Hugh Watson, Mr. McCombie carried it on with a skill and success that have few equals, and that will cause his name to be handed down to posterity. It has been truly said that what the Collings's did for Shorthorns, Hugh Watson did for the polled breed, and it might with equal truth be said that what Amos Cruikshank has been to the "red, white, and roan," Mr. William McCombie was to the "glossy blacks." The Tillyfour herd dates from 1830, and was finally dispersed in 1880, a few months after the death of its worthy owner. His success in the showyard has few parallels in the history of farm stock. In the third edition of his volume, entitled "Cattle and Cattle Breeders," no fewer than seventeen pages are occupied by a mere record

of his premiums won by animals belonging to the herd prior to 1875. He several times entered international contests in France, and on all occasions returned with new laurels. But probably the crowning victory of his life was achieved at the great International Exhibition held in Paris in 1878. On that occasion, in addition to several class honours, he carried off with a group of beautiful young polled cattle, all bred at Tillyfour, not only the £100 prize for the best group of cattle bred by the exhibitor in the division foreign to France, but also the £100 prize "for the best group of beef-producing animals bred by the exhibitor." In fat stock as well as breeding shows he often proved invincible, and altogether it may safely be said that the high reputation which the breed has deservedly gained beyond the bounds of the British Empire has, to a very large extent, been fostered by the remarkable showyard achievements of the Tillyfour herd. It would occupy needlessly too much space to enumerate all the noted herds of Aberdeen-Angus cattle that have been established in Scotland, England, Ireland, North and South America, South Africa, and many other places comparatively little known to the inhabitants of this side of the globe, but special notice must be made of the premier polled herd of the present day, that of Ballindalloch, on the borders of the two counties of Banff and Moray. Of the early history of this herd little is definitely known. The influence that this herd has exercised in the improvement of other stocks can hardly be over estimated. The fame of the herd is equally great in the breeding paddock, the showyard, and the sale ring. In 1850 Sir John Macpherson Grant, then owner of Ballindalloch, bought two animals, a cow and bull, from Mr. McCombie. At his death his successor, Sir George Macpherson Grant, went to reside at Ballindalloch in 1861, and it was then that the improvement of the herd received that attention which made it take the leading position in the county. The first animal purchased by Sir George was Erica (843), acquired at the Earl of Southesk's sale in 1861 for fifty guineas. Jilt (973), another remarkably good breeding cow, was purchased from Mr. McCombie in 1867 for seventy guineas. Another good addition was Sybil (974), for sixty-three guineas. She gained almost every prize she competed for. He also acquired animals of the Pride and other noted families. The closest attention was, without intermission, bestowed on the selection of sires. Distinguished success was achieved in the building up of families; the place of honour in that respect has been accorded to the Ericas, of Keillor origin, and it has come to be regarded as one of the choicest strains of polled cattle; but there are many breeders of note who prefer the Pride of Aberdeen family of Tillyfour notoriety. Sir George M. Grant died a few years ago, and was succeeded by his son, Sir John, who continued the herd on the lines of his father; but he had a short reign; died a few months ago, and was succeeded by his only son, the present Sir John M. Grant, and some anxiety has been expressed among breeders as to whether he will continue the herd on the lines so successfully carried out by his grandfather. The great success of the Shorthorn Aberdeen-Angus cross has been referred to above. At the time it was first adopted, Shorthorn bulls were few in Scotland, and bulls of that

breed were used on the native polled cows. Experience has since shown that the greatest success results by the use of Aberdeen-Angus bulls and Shorthorn cows in the production of what has become generally known as the favourite butchers' beast, the "blue roan." The better to understand the true important points of the male Aberdeen-Angus, I submit a photograph of the bull Jeshurun, a one-time champion of the Scottish National Show, and perhaps the best bull of his century, a study of which cannot be otherwise than profitable to breeders of beef cattle generally. Passing over the minor points, the shoulder-blades

PLATE 11.—"JESHURUN," CHAMPION ABERDEEN-ANGUS, HIGHLAND SHOW

should lie well backwards, fitting neatly into the body, and not lying awkwardly outside of it. They should show no undue prominence on the shoulder top, on the points, or at the elbow. An upright shoulder in cattle is generally accompanied by a light waist—an important and in all breeds a much too common defect. The chest should be wide and deep to give plenty room for lung development. The bosom should stand well forward between the fore legs, and underneath should be well covered with flesh and fat. *The crops should be full and level, with no falling off behind them.* The last sentence is italicized because it is a weak point in many of the Shorthorn bulls introduced into Queensland from what are called the fashionable herds of Victoria. The ribs should be well sprung, springing out barrel-like, and neatly joined to the crops and loins; the back level and broad; the loins broad and strong; the hook-bones not too wide—narrower than in an average Shorthorn; the


SCALE OF FEET
0 5 10 15 20 25 30 35 40
PLAN OF DRAFTING YARD FOR SHEEP
TO BE CONSTRUCTED FOR SMALL FLOCK OWNERS
WING
6 GATE
29'
58
6 GATE
4 FT GATE
11 8
10' 0
CHECK PENS
DRAFTING GATE
19
6' FT GATE
2 0
DRAFTING RACE
6 0 SWING GATE
26'
FORCING PENS.
4 GATE
5FT GATE
4 FT GATE
19'
FORWARDING YARD
32
30
100'
40
TWO 5FT GATES
SHEEP ENTER
8 GATE
25
20
70'
WING
CAPACITY ABOUT 1500 SHEEP
15/3/15

quarters long, even, and rounded, with no hollow from the hooks to the tail. On both sides of the tail the quarters should turn away in a rounded manner, swelling out downwards and ultimately passing into thick deep thighs. The bottom line should be as even as the top and side lines. All over the frame there should be a rich and even coating of flesh. Even the hook-bones and other prominent parts should be well covered with flesh; and, above all, there should be no patchiness —no hollows, and no rolls of hard flesh, with spaces of soft useless fat between them. Cows differ considerably in character. The head is finer, the skin not quite so thick, the udder large, and milk-vessels large and well defined. The illustration of the bull accompanying these notes comes up to Bakewell's principles of breeding: "To get beasts to weigh where you want them to weigh," in the roasting instead of the boiling pieces; that the shape should give "the greatest value in smallest compass"; that the shape that does that is correlated with a hardy constitution and great readiness to fatten; that "the smaller the bone the truer the shape." The superiority of the black polls over most other breeds for the butcher's purpose lies in the excellent quality of beef, and in the high percentage of dead meat to live weight; the beef is very well mixed and contains a greater proportion of compact, finely-grained flesh, and less soft, coarse fat than most other kinds of beef. Inside the carcass is usually well lined with fat of the finest quality, while in the density and quality of the carcass itself, the breed may fairly claim the premier position among all the leading breeds of cattle. Some place the small Devon breed alongside, if not even before, it in this respect; but, with that exception, perhaps there is no other breed that will, on an average, yield so high an average yield of dead to live weight. In butchers' phraseology, it "dies" well and "cuts up" admirably.

HANDY SHEEP YARDS.

Mr. W. G. Brown, Sheep and Wool Expert of the Department of Agriculture and Stock in this State, supplies the accompanying diagram of an effective and cheaply erected sheep yard. He says:—

The accompanying plan, drawn from scale, is a handy set of yards for owners of flocks of under 2,000 sheep.

They may be made of round stuff, 9-ft. panels and 4 ft. high. That means the posts shall be 6 ft. long and 2 ft. in the ground.

It is taken from the "Journal of Agriculture," New South Wales.

A similar set is in use at Gindie State Farm and has been found very handy to work.

The capacity is about 1,500 to 1,700 sheep comfortably filled.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF FEBRUARY, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Bella ...	Ayrshire	19 Jan., 1915	740	3·8	32·93	Cows fed on natural pasture only.
Honeycomb	Shorthorn ...	27 July 1914	556	5·0	32·80	
Nellie II. ...	,, ...	20 July ,,	682	3·8	30·34	
Butter ...	,, ...	20 Nov. ,,	462	3·8	28·58	
Sweet Meadows	Jersey	28 July ,,	375	6·4	28·45	
Lady Dorset	Ayrshire	20 Sept. ,,	468	5·1	28·23	
Madam Melba	Holstein	8 Sept. ,,	727	3·3	27·99	
Miss Jean ...	Ayrshire	24 Nov. ,,	594	3·9	27·14	
Burton's Lily	Shorthorn ...	17 Nov. ,,	575	4·0	26·99	
Silver Nell...	,, ...	5 Oct. ,,	533	4·2	26·27	
Miss Melba...	Holstein	6 Mar. ,,	785	2·8	25·56	
Glen ...	Shorthorn... ...	26 Oct. ,,	570	3·8	25·38	
Daisy ...	Holstein	26 Nov. ,,	734	2·8	23·88	
Lady Margaret	Ayrshire	19 June ,,	496	4·1	23·87	
Violette's Peer's Girl	Jersey	22 Oct. ,,	437	4·6	23·67	
Simple Interest	,, ...	24 Nov. ,,	502	4·0	23·54	
Countess of Brunswick	Shorthorn ...	27 July ,,	499	4·0	23·42	
Bluebell ...	Jersey	27 May ,,	439	4·5	23·26	
Lady Melba	Holstein	6 Mar. ,,	585	3·4	23·21	
Rosebud II.	Ayrshire	20 Sept. ,,	509	3·7	22·05	
Special Edition	Jersey	19 Dec. ,,	450	4·0	21·10	
Dolly ...	Shorthorn... ...	19 Dec. ,,	604	3·0	21·09	
Lark ...	Ayrshire	27 July ,,	366	5·5	20·79	
Lowla II. ..	Shorth'rn-Ayrshire	23 Sept. ,,	492	3·6	20·73	
Lady Lil ...	Jersey	22 Aug. ,,	353	5·6	20·66	
Lucinda ...	Ayrshire	20 Sept. ,,	486	4·3	20·58	
Princess Kate	,, ...	20 Sept. ,,	361	5·5	20·46	
Miss Lark ...	,, ...	31 Oct. ,,	466	3·7	20·20	
Burton's Lady	,, ...	23 July ,,	506	3·4	20·10	

ORIGIN OF THE ILLAWARRA BREED OF DAIRY CATTLE.

Relative to the origin of the Illawarra breed of dairy cattle, Mr. E. Graham, Government Dairy Expert, writes:—

There is available no absolutely authentic information relative to the origin of the now generally recognised Illawarra breed of dairy stock, and although quite a number of theories have been advanced in explanation of the foundation of the breed, the evidence in support of the claims made is more or less of a circumstantial nature. However, it is definitely known that in the early history of Australia dairying pursuits were restricted exclusively to the Illawarra district of New South Wales, and

the primary importations of cattle to Australia comprised chiefly the Shorthorn, Ayrshire, and Devon breeds. There were few opportunities offering for the introduction of new blood into the dairy herds, and naturally it followed that the dairy farmers had by compulsion to utilise stock raised within their immediate district, and descended from representatives of the breeds mentioned above.

Consequently it is obvious that the Illawarra must necessarily be a blend of the Shorthorn, Ayrshire, and Devon breeds, with a probable further admixture of other breeds of dairy cattle that were known to have been imported in lesser numbers and at a comparatively later period.

After persevering for some considerable time with the breeding of stock on the lines indicated, it was ultimately claimed that a distinctive breed of dairy stock was evolved, and this particular type of dairy animal was designated the Illawarra, an adoption of the name of the district wherein the representatives of the breed were primarily developed.

There is in existence an Illawarra Breeders' Association and Herd Book, and admirers of this class of dairy animal are attempting to further the interests of the breed throughout the Commonwealth, and possibly the secretary, Mr. R. S. Maynard, 303 Queen street, Brisbane, would, upon application, supply you with information relevant to the origin of the breed.

DAIRY SALTS.

By E. GRAHAM, Dairy Expert, Department of Agriculture and Stock.

A deal of valuable work in connection with the analyses of dairy salts has from time to time been performed by the Agricultural Chemist (Mr. Brünnich), and the results of that officer's determinations and comments relative to the composition and characteristics of the various brands of dairy salts analysed, have appeared in the columns of the "Agricultural Journal."

It is gratifying to know that the recommendations of the Agricultural Chemist have been so fully adopted by manufacturers of dairy products, and to-day dairy factories are almost without exception using a chemically pure salt in the manufacture of their goods.

Recently another "brand" of salt has been placed on the market, and from the result of the analysis of the product it is of a high standard in quality, and in composition it approximates the best salt hitherto procurable in this market.

However, in the introduction of this particular salt, certain claims have been made in its favour, which, if accepted, are not likely to serve the best interests of the dairying industry in this State.

One of the alluring statements advanced is that by the use of this particular salt in the salting of butter it is possible to appreciably increase the amount of "overrun" at the butter factory, yet in no way detract from the quality and flavour of the butter subjected to the treatment.

For the purpose of illustrating the similarity in the composition of this salt as compared with that of the finest dairy salts used in our butter factories, the following results of the analyses made of the salts by the Agricultural Chemist are given:—

ANALYSES OF DAIRY SALTS.

	Lymm Brand.	Leslie Brand.
Sodium Chloride	99·83	99.68
Sodium Sulphate	Nil.	Nil.
Calcium Sulphate	Nil.	·12
Magnesium Chloride	Trace	·03
Insoluble Matter	·05	Nil.
Combined Water	·03	·14
Moisture	·09	·03
Total Water	·12	·17

The physical condition of the salts is identical, the small granules of both salts being of cubical form, and the even shape of the crystals denotes the probability of both salts being obtained by a very similar process of crystallisation.

Needless to remark, the percentage of sodium chloride contained in a commercial salt is an index of its purity, quite irrespective of the primary source from which the salt is obtained (either sea water or salt mine), and with salts so kindred in their chemical constituents as the foregoing, it is ridiculous to expect that any manifest difference in the behaviour of the respective salts would be found upon their being introduced into butter under identical conditions.

The intrinsic value of both salts is almost equal, and from a commercial standpoint the market quotations for both salts should be in similar agreement, allowing possibly for fluctuations due to the conditions of ordinary trade.

The salt under review has been subjected to practical tests at one of our butter factories, and through the courtesy of the manager of the company concerned, the results of several tests carried out at the factory under the supervision of the manager are available.

Test No. 1.—In this instance, sample No. 1 represents butter salted with "Leslie" salt, and No. 2 was salted with "Lymm" salt, both under ordinary working conditions. On the day's output of butter, that salted with "Leslie" salt shows 1 per cent. higher "overrun."

Reference to the result of the analyses of these samples of butter made by the Agricultural Chemist proves that the nature of the salt utilised was not responsible for the increased "overrun," the determinations by that officer being:—

Butter.	Sample No. 1.	Sample No. 2.
Moisture	14·27	14·86
Salt	1·58	1·44
Curd	·46	·70
Fat	83·69	83·00

Test No. 2.—A quantity of cream was churned, the butter-milk drained off, and the butter in the churn washed preparatory to salting, then 292 lb. of the butter was placed on a butter-worker and 292 lb. lodged on another "worker." To the butter on each worker was added 12 lb. of "Lymm" and "Leslie" salts respectively. Both butter-workers

were set into operation, and the process of working the butters was continued for exactly the same space of time. Upon completion of the working the butters were weighed separately in bulk. The weight of the butter salted with "Lymm" salt was 278 lb., and the weight of the butter salted with "Leslie" salt was 276 lb.

The result of the analyses of these butters, as provided by the Agricultural Chemist, is as follows:—

Butter.	Sample No. 1A (containing "Lymm" Salt).	Sample No. 2A (containing "Leslie" Salt).
Moisture	12·68	12·95
Salt	2·27	2·05
Curd	·57	·55
Fat	84·48	84·45

Test No. 3.—Two parcels of cream were selected. One comprised 17 cans and the other 22 cans of cream. The cream was duly weighed, sampled, and tested by the Babcock method. After cooling, &c., the cream formerly contained in the 17 cans was deposited in Churn No. F.M.I. and made into butter.

By test results this cream was estimated to yield 680 lb. of commercial butter. The amount of commercial butter obtained from the churn was 704 lb. In the salting, 40 lb. of "Leslie" salt was added.

The cream from the 22 cans was placed in Churn No. F.M.2 and made into butter under churning conditions similar to No. F.M.1.

By test calculations the commercial butter yield from this cream was 702 lb., and the churn result was 720 lb. commercial butter.

In salting, 32 lb. of "Lymm" salt was added.

The respective salts were added in the ratio of about 6 and 4½ per cent., and although added to the butter in smaller percentage, the incorporation of the "Lymm" salt is shown to be comparatively higher than that of the other salt used.

Samples of these butters were analysed by the Agricultural Chemist, and the results are given below, together with comments made by that officer.

Butter.	Sample F.M. 1("Leslie" Salt, added in the ratio of almost 6 per cent.).	Sample F.M. 2 ("Lymm" Salt, added in the ratio of 4½ per cent.).
Moisture	15·80	15·69
Salt	2·38	2·84
Curd	·66	·71
Fat	81·16	80·76

"Butters are too salty for ordinary trade purposes, and although below 16 per cent. of moisture, both butters would be condemned for export as being below standard in butter fat."

There still exists a need for dairy factories to use only a chemically pure dairy salt, and it is a matter for regret that salt of Australian origin is not to be recommended in this connection, and until such time as an improvement is effected in the quality of Australian salt and a chemically pure salt produced within the Commonwealth, dairy companies will be obliged to procure their supplies of salt from oversea sources.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY, 1915.

Four thousand four hundred and forty-seven eggs were laid during the month, as against 3,643 for the corresponding month last year. This is very good laying for February, being an average of 111·2 per pen. Some of the competitors are doing remarkably good work, while others are moulting heavily and appear to have nearly finished laying. In J. M. Manson's No. 2 pen all the birds are in moult. It will be noted that there are only 62 eggs difference between the first five pens. Marville Poultry Farm wins the monthly prize with 140 eggs. The following are the individual records:—

Competitors.	Breed.	Feb.	Total.
A. T. Coomber	White Leghorns ...	122	1,450
Moritz Bros., S.A.	Do.	128	1,434
Loloma Poultry Farm, N.S.W.	Do.	119	1,417
T. Fanning	Do.	104	1,391
Geo. Tomlinson	Do.	130	1,368
Cowan Bros., N.S.W.	Do.	109	1,330
Marville Poultry Farm, Victoria ...	Do.	140	1,325
R. Burns	Black Orpingtons (No. 1)	115	1,320
A. H. Padman, S.A.	White Leghorns ...	128	1,320
A. F. Camkin, N.S.W.	Do.	117	1,319
Mrs. Munro	Do.	126	1,314
Loloma Poultry Farm, N.S.W.	Rhode Island Reds ...	97	1,302
T. Fanning	Black Orpingtons ...	132	1,300
E. Le Breton	White Leghorns ...	109	1,295
Kelvin Poultry Farm	Do.	93	1,290
E. V. Bennett, S.A.	Do.	131	1,289
Derrylin Poultry Farm	Do.	129	1,287
Mrs. Beiber	Brown Leghorns ...	111	1,268
F. McCauley	White Leghorns ...	128	1,268
R. Burns	Black Orpingtons (No. 2)	106	1,264
R. Burns	S. L. Wyandottes ...	117	1,261
J. T. Coates	White Leghorns ...	123	1,260
J. Franklin	Do.	111	1,243
J. R. Wilson	Do.	102	1,234
J. T. Coates	Black Orpingtons ...	104	1,225
J. M. Manson	White Leghorns (No. 1)	106	1,223
J. Zahl	Do.	129	1,219
G. E. Austin	Do.	108	1,219
J. Kilroe	Do. (No. 2)	105	1,210
Range Poultry Farm	Do.	118	1,198
D. Moreton, N.S.W.	Do.	98	1,171
R. Jobling, N.S.W.	Do.	72	1,169
J. Gosley	Do.	82	1,169
J. D. Nicholson, N.S.W....	Do.	94	1,157
J. N. Waugh, N.S.W.	Do.	119	1,146
Mrs. Bradburne, N.S.W.	Do.	110	1,145
J. Murchie	Brown Leghorns ...	107	1,124
J. Kilroe	White Leghorns (No. 1)	96	1,114
C. M. Jones	Do.	79	1,105
J. M. Manson	Do. (No. 2)	93	1,094
Totals	...	4,447	50,237

State Farms.

NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, JANUARY AND FEBRUARY, 1915.

Mr. C. E. Wood, manager, reports:—

Rainfall for the month of January, 2·73 in. Number of days on which rain fell was 14.

Maximum reading, 101 degrees Fahr., on the 2nd instant.

Minimum reading, 69 degrees Fahr., on the 14th instant.

Rainfall for January, 1914, 28·97 in., which fell on 14 days.

From the above it will be seen that the new year has started with a very dry month, being, in fact, the second driest January of the 26 for which records have been kept.

The heat during the first few days of the month was intense.

Work amongst young coffee consisted in keeping clean round plants and scything the remainder of ground. Disbudding on tips of primary branches was also carried out.

Vanilla.—Training vines where necessary. Growth still continues good.

As is usual at this time of year, the principal work is scything and keeping down weeds.

Rainfall for month, 5·55 in. Number of days on which rain fell, 9. Extreme maximum temperature, 102 degrees F. on the 10th instant; extreme minimum temperature, 67 degrees F. on the 17th instant. During the first half of the month we had some of the hottest weather ever experienced in this district, and the total rainfall for the two months of this year is the lowest on record.

Coffee.—Instead of continuing to keep down weeds, &c., by using the scythe—this method being best during the heavy rains—all the ground has had to be clean hoed, all grass and weeds left to wither and shade the ground.

Vanilla.—During the month 500 cuttings were taken for planting up a demonstration plot at Babinda, near the Russell River; another 500 was supplied to a settler who has started in this district; applications for smaller quantities were also received and supplied, which goes to show that some practical interest is being taken in the cultivation of this valuable product.

A tree which bore fruit this month was the longan (*Nephilium Longanum*), a fruit closely allied to the litchi. The fruit of the longan varies in quality on different trees—as also does the litchi—and while at its best it cannot compare with the litchi, it is still a very palatable fruit and is evidently relished by the Chinese, as they will give 3d. per lb. and do the harvesting. Unfortunately, owing to high winds, and the attacks of various beetles, most of the crop was destroyed, otherwise the crop from our one tree would have been worth about £2. Apart from its fruit, this tree, although a slow grower at first, eventually makes a very handsome shade tree.

The Orchard.

CULTIVATION OF PASSION VINES (*PASSIFLORA EDULIS*).

BY C. ROSS, F.R.H.S., Instructor in Fruit Culture.

Considerable attention has been given to the cultivation of this delicious fruit for many years in this State, but for the most part in a very slovenly manner.

Being a rampant grower, it often presents a jumbled up mass of twisted vines and foliage, rambling over old fences, outhouses, and trees, and absolutely untrained. Passion fruit, when properly grown, is one of the most remunerative of crops, and can be grown at a minimum of expense. In some cases it has yielded up to £100 per acre in the second year. Passion fruit is sometimes grown in conjunction with citrus trees, and this is a very good and economical method, provided the citrus trees are grown on a good sandy loam not far from the coast and planted at not less than 25 ft. apart—30 ft. would be better.

If grown in this manner the vines should be rooted out after the second or, at latest, the third crop is gathered, as by that time the citrus trees will be bearing fruit and will require all the sustenance the land can provide. In any case, the passion vines should receive annual dressings of fertilisers from the time they are planted.

The winter crop pays best, and situations should be chosen that are not subject to keen frosts.

As most of our coastal areas are deficient in lime, a good dressing of half a ton or more per acre would be beneficial, applied in the form of lime screenings or fresh burnt lime. It should not be ploughed under, but broadcasted and harrowed in.

Seeds should be saved from the best fruits and raised in seed beds, boxes, or pans in July and August. When the seedlings are strong enough to handle, say, from 6 in to 12 in. high, they should be planted out—during September or whenever the weather is favourable in early spring. Sheltering and watering may be necessary until they are well established, and a good thick mulch put round the plants during the first year's growth.

Lay out the ground by erecting ordinary split posts as in fencing (*i.e.*, flat sides opposite), about 4½ to 5 feet above ground.

The posts at each end of the row should be well strutted, and the intermediate posts placed at distances of from 15 to 20 ft. apart. The space between the rows should be at least 10 ft., to allow of cultivation, air, and sunlight. Along the tops of the posts strain two No. 8 parallel wires 6 or 7 in. apart.

Plant the young vines 12 to 15 ft. apart immediately under the wires, and train a single stem to a small sapling, allowing no laterals until the wires are reached, then pinch out the top and train one or two of the subsequent leaders to each side of the main stem. Where ties are

necessary, plenty of room should be allowed for expansion. The vines are voracious feeders and will need abundance of nitrogenous aliment, especially if an off season crop is wanted. Very little attention, except the regulation of growth, will be required the first season. During the second season, laterals will be produced, which will reach to the ground in the form of a screen or curtain, on which the fruit is borne.

For the production of a winter crop, prune off the laterals about 1 ft. beneath the wires in early November, and manure the whole surface with a complete commercial fertiliser, or according to Mr. Brünnich's formula, *i.e.*—

4 to 8 cwt. blood and bone manure,
1 to 2 cwt. superphosphate, per acre,
1 to 2 cwt. sulphate of potash,

according to the quality of the soil.

It is preferable to give this dressing twice—half the quantity immediately after pruning, and the remaining half before the end of the summer rains, about March. A fair crop will be gathered during the second season, but the highest prices will be commanded during the following winter. The custom in vogue is to use the long quarter-case, but the flat case is preferable. A better pack is secured and the fruit is exhibited to the best advantage. The following is the regulation size of the flat quarter-bushel case:—13¾ in. long by 10⅛ in. wide by 4 in. deep, inside measurement. This will hold three tiers of first-grade fruit. No fruit pays better to grade and pack carefully. The first grade should be the largest, well coloured, and perfect fruits; the second grade the same only smaller, but perfectly even. All culls, if sound, should be made into a third grade.

The passion vine is not a long lived plant, and after the third or fourth year generally succumbs to the attack of a parasitic fungus which appears in yellowish-brown spots on the foliage, and as the malady progresses the fruit shrivels and the branches die back. Should the disease appear in the earlier stages of growth, it may be controlled and checked by periodical sprayings of Bordeaux mixture or sulphur-lime wash.

THE WAR OF THE APPLES—STANTHORPE V. AMERICAN. ITS CAUSE AND ULTIMATE EFFECT.

By J. HENDERSON.

The cause of the above war is briefly this:—For several years past, some of the Brisbane fruit merchants have been carrying on what might well be termed a roaring and profitable trade in American apples. But just as these merchants reach the heyday of perfection, a small cloud makes its appearance on the horizon. To be more concise, this small cloud represents the apples grown by Queensland's sons of toil on the great granite belt of the Stanthorpe district. On this belt the apple grows to the highest state of perfection. Men who have travelled the world over admit this fact; fruit merchants and fruit growers from the

Southern States admit it, and the man in the street admits it. But the city fruit merchants who are dealing with American apples will not admit this fact, so the war continues, and may it continue a little longer, but with tenfold fierceness, for on the fierceness of this battle depends the measure of perfection to which the apple industry of the Stanthorpe district will attain. Legislation cannot effect a cure or in any way give relief. It rests entirely on the skill and energy applied by the growers themselves. And when they emerge from the struggle as conquerors, then, and not till then, will they bless the day when the American apples glutted the Brisbane markets.

Keen competition is the life of trade, and as far as the quality of Stanthorpe apples is concerned, they need have no fear. But quality is not everything, for very leaky houses can be built with first-class materials. So all ye growers in the granite belt, note, that if you wish to obtain the highest value for your apples, you must learn how to prepare and place them on the market. There must be no shoddy or slipshod work, for therein lies the secret of success. Make a beginning at once. Plant only varieties of the highest qualities; use the most up-to-date methods in harvesting, grading, packing, and marketing your apples; and remember to discard all small, worthless, diseased, damaged, and badly deformed apples, for the inclusion of such will certainly reduce the value of the case. Growers in this district who are working on the above lines were getting as high as 12s. 6d. per case for Jonathan apples in the Brisbane markets last month, and as soon as the apple growers of the Granite Belt carry on their industry on the above lines, then, and not till then, will the American apple cease to compete with the apple from the Granite Belt.

During the present season I have seen far too many cases of apples leaving this district that contained grades ranging from $\frac{3}{4}$ in. to 4 in., and which were not packed, but simply thrown into the cases. On the other hand, I have seen apples of high quality, which, with proper handling, would have commanded a high price, but which were so badly bruised in gathering and casing that they were almost worthless. Remember to handle apples more carefully than eggs.

STAGGERS IN HORSES.

In treating staggers in horses, the cause of the trouble must first be ascertained. In the majority of cases it is due to dietetic causes, —viz., eating some poisonous weed. If this be the case, all animals should be removed into a fresh paddock where there are no poisonous weeds. In some cases it is due to inflammation of the brain, in which case the disease is diagnosed by blindness, dizziness, running round in a circle. In such cases, a dose of physic consisting of aloes should be given at once. Bleeding is often resorted to with good results. The animal should be given soft bran mashes two or three times daily, with one teaspoonful hyposulphate of soda mixed in it. A plentiful supply of clean cold water is also necessary.

Apiculture.

ARSENICAL SPRAYS AND BEES.

"South African Gardening" (February, 1915), a very useful and interesting journal published in Johannesburg, contains the following correspondence between an apiarist at Johannesburg and the Director of Agriculture, Pretoria, which will be read with interest by bee-keepers and fruit-growers in Queensland:—

ARSENICAL SPRAYINGS.

WHICH ARE YOU KILLING, CODLIN MOTHS OR BEES?

SIR,—During the spring of this year my attention was drawn to some incidents which, I think, merit your consideration.

In my garden at Houghton Estate, Johannesburg, I was keeping a hive of bees, and during the early spring, while the fruit trees were coming into blossom, I noticed that a very great number of my bees were dying every day. I have kept bees practically all my life, and was at a loss to understand the cause of death to practically all the bees in my hive.

The most unusual circumstance with regard to the incident was that the bees were dying on the ground in front of the hive at a distance of anything from one to ten or twelve yards.

After a very careful examination and many experiments, I could only come to one conclusion, which was that the bees were being poisoned. I then consulted with one or two friends who are also interested in bee-keeping, and one gentleman informed me, without any hesitation, that the bees were being poisoned with the arsenical spray used in connection with the spraying of fruit trees in the neighbourhood. I have since read a good deal on the subject, and am forced to the conclusion that this can have been the only possible cause of death.

In certain States in America this form of bee poisoning has become a very serious matter, and legislation in respect thereof has been passed or is in contemplation.

Most of the authorities on the subject are of the opinion that the trouble is caused by the fact that the fruit blossom is sprayed before half of the petals have commenced to fall. It is obvious that if no spraying is done until after the petals begin to fall, naturally no injury can result to the bees, because the nectar is not secreted in flowers from which the petals are falling. In other words, unless the owners of fruit orchards are made to realise that spraying before the petals have begun to fall is useless, trouble will be experienced in keeping bees in safety in any district where spraying is customary.

I should be glad if you would submit this to the consideration of the botanical experts in order to ascertain whether my assumptions with

regard to the correct time for spraying are correct, and, in any case, I should be glad to hear from you as to whether there is any remedy for this new and apparently unnecessary disease in South African apiaries.

I have, &c., (signed) ALEX S. BENSON.

The Director of Agriculture, Pretoria.

In reply to this letter, which was referred to the Chief of the Division of Entomology, the latter wrote:—

It seems to me highly probable that the death of your bees was, as you contend, due to injudicious spraying of fruit trees with arsenical poisons. The remedy lies in educating the fruit growers and gardeners to time spraying to effect the destruction of the injurious insects they aim to destroy, and not the destruction of beneficial insects, like bees, which in their own interests it should be their aim to protect from unnecessary harm.

The sole object at Johannesburg and in most other places in the Union in spraying deciduous fruit trees while they are in blossom is for the protection of the fruit against the codling moth. There are, then, three main effects to consider, namely—

1. The effect on blossoms.
2. The effect on bees.
3. The effect on codling moth.

There is difference of opinion amongst authorities as to the effect on the blossoms, but I think it safe to assume that the effect is of little consequence and almost wholly mechanical. However, such effect as there is is undoubtedly injurious.

The effect on bees is of far greater importance, and disastrous consequences, such as you report, probably occur quite frequently, to judge by the complaints made to officers of this Division by bee-keepers and by sundry official observations. An American investigation disclosed that brood bees in uncapped cells as well as worker bees might be killed by the poison taken from the blossoms, and it was concluded "that bees are liable to be poisoned by spraying the bloom of fruit trees, the liability increasing in proportion as the weather is favourable for the activity of the bees, and that all bloom must have fallen from the trees before the danger will have passed."

The effect on the codling moth is the phase of greatest importance to the average fruit-grower, and, to express it curtly, that effect is practically NIL so far as the protection of the fruit still in the bloom stage is concerned. The poison that lodges on the blossoms is nearly all shed, and most of what remains is placed where no codling moth larva will ever find it.

It follows that the spraying of blossoms with arsenicals to kill codling moth is an utter waste of time and material, and does decided harm by exposing bees to poisoning.

The time to begin to spray trees to kill codling moth is immediately after *the blossoms have fallen.* Then poison can lodge in the little obstructed calyx cup (blossom end) of the newly formed fruit, and there

be ready for the enemy which usually enters at that point. An occasional larva may enter a forming fruit before the blossom falls, but any such one is doomed to perish through insufficiency of food if it does not soon leave, and it deserves no consideration.

In nearly all parts of South Africa, however, the blossoming period of rosaceous fruit trees is extremely protracted compared to what it is in Britain, Northern Europe, Canada, and the United States generally. It commonly happens that a goodly number of fruits have grown to be an inch or more in diameter and are infested with codling moth before blossoming has ceased. Indeed, it is not unusual for a tree to have two or three distinct blossoming periods in the one season. Under such conditions, I hold that the fruit grower should go ahead with his spraying as soon as a considerable proportion of the fruits reach the proper stage, notwithstanding the liability of poisoning some bees. If he neglects to protect the early formed fruit, he is likely to have extreme difficulty in protecting the crop from the second generation of the pest.

The principle of waiting until the majority of blossoms are off before spraying is now generally recognised in the south-western districts of the Cape, where vastly more spraying against the codling moth is done than in all the rest of the Union; and whereas damage to bees in that part was not infrequently a source of trouble ten years ago, little is now heard of it there. As time goes on the public elsewhere will get educated on the point. Legislation would help very little, but I think much is to be gained by an occasional discussion of the matter in gardening periodicals.

(Signed) C. P. Lounsbury, Chief, Division of Entomology.

EARLY TABLE GRAPES.

First and Second Early Grapes.—Black Hamburgh, Chavuch, Cinsaut, Madelune Royal, Snow's Muscat, Royal Ascot, Concord, Goethe, Wilder, Buckland's Sweetwater, Chasselas, Early Sherry.

The number of plants required per acre on the square system, at 7 ft. apart, is 889; at 8 ft. apart, 680. The best system, says Mr. C. Ross, Instructor in Fruit Culture, is to plant in rows, from row to row 9 ft., and between plants in the row 7 ft. apart. The Isabella is a capital stock for European vines, and it is advised that present stocks be grafted, instead of grubbing them out. Of course, all European varieties will do well on their own roots.

GRAPES SUITABLE FOR THE ROCKHAMPTON DISTRICT.

Wine Grapes.—Black Hamburgh, Snow's Muscat, Syrian, Royal Ascot, Wilson, Ione, Goethe, Gordo Blanca. Cuttings of the above may be obtained from the State Farm, Bungeworgarai, Roma, at 6s. per 100, including freight, or rooted plants from any of the Brisbane nurserymen at 5s. per dozen.

Tropical Industries.

NOTES ON TOBACCO CULTURE—No. 3.

BY NICHOLAS SACHOULIS, Turkish Cigarette Tobacco Grower and Expert, Inglewood.

HARVESTING.

Six weeks after topping, the crop is generally ready for harvesting. Tobacco is ripe when grown up, and the leaf shows brown spots and a rough surface. The leaf is very brittle, breaking readily when doubled up.

Now begin the most particular operations of the whole process of making tobacco, for it is now that you must fix in the leaf the desirable qualities that go to make a valuable product, such as elasticity of leaf, flavour, colour, &c. Cut your tobacco in the afternoon, but not after heavy rain, nor if dew is on the plants, neither when the rays of the sun are very hot. Rain washes the gum off the tobacco, therefore wait a few days for it to gather gum again.

In hanging tobacco on the stick, it should not be put closer than 3 to 5 inches apart, according to size of the plant.

Remarks.—If you desire your tobacco to have a good colour, bright, golden red and mottled, hang your sticks in the shed very close, from four to six days, till leaf and stem have become perfectly limber and yellow.

SUN CURING TOBACCO.

Then remove your sticks on the scaffold for a week or two, hang them from 6 to 10 in. apart. When the colour is good enough and the leaf getting dry—*i.e.*, when the sap is leaving it—the poles are transferred to the shed and placed in position, there to hang till nearly all the sap has left it. In sun-curing the leaf should never be allowed to get wet either by rain or dew.

FLUE CURING.

The leaf at the time of harvesting contains a large amount of water, but it is evident that the curing is something more than drying, for a leaf dried out rapidly by heat has few of the desirable properties of a well-cured leaf. Again, a leaf dried under the right conditions in "sun curing" weighs much less than would the same leaf if dried out quickly. The most important fact to keep in mind is that the leaf must be kept alive till the first stage of the curing is completed, till yellowing begins, and this brings us to the question of the most favourable condition for curing.

The primary object of flue-curing is to produce bright colour in the leaf, but in the drying winds of South Queensland it is becoming evident that heat has a value in the curing of dark tobacco, if for no other reason than to remove the greenness so common in much of the air-cured leaf.

Turkish tobaccos have been commonly sun-cured, but experiments conducted during the past season indicate that these tobaccos can also be cured in the flue barn. By this method the loss due to unseasonable weather is avoided, the colour is brighter and more even, and, as far as can now be judged, there is no loss in flavour or aroma. When harvesting tobacco for flue-curing we prefer to prime the leaves that are fully ripe. The tobacco is then carried in baskets to the barn, where it is tied on sticks with wire or string. The barn should be filled as rapidly as possible, for if a portion of the leaves becomes wilted while the remainder are still fresh, it is almost impossible to cure a barn of even bright colour. As soon as the barn is full, start a slow fire in the furnace, and slowly bring the barn up to a temperature of 90 degrees Fahr. A hot fire at the start will ruin much of the tobacco in a few minutes, therefore the temperature of 90 degrees should be maintained until the leaf has yellowed. When the leaf is ripe and sappy, and has been grown on a sandy soil, this will not be difficult, but where the leaf has made a slow growth and is leathery, it often refuses to colour. In the latter case increase the humidity of the room by sprinkling water on the flues until the air feels moist. The yellowing stage will require from twelve to twenty-four hours, and so long as the temperature does not run over 100 degrees, the fire will not require much attention. This, it must be remembered, is for tobacco that will not yellow, and does not apply to bright colour.

The second stage of flue-curing is that of fixing the colour at 100 degrees in four hours.

After the temperature has been slowly increasing for from fifteen to twenty hours, and the leaf has lost the greater portion of its moisture, it will begin to dry at the tips and around the edges. Where this drying is general throughout the barn, the second stage may be regarded as at an end. The temperature at this point, raised 2 degrees every hour, should be about 120 degrees Fahr.

The third stage simply consists of the rapid drying out of the leaf, and is commonly called the "killing" of the leaf. The temperature is increased from 120 degrees to 135 degrees or 140 degrees Fahr., at the rate of 4 or 5 degrees an hour, and is held at the higher temperature until the midrib is perfectly dry and brittle. During this stage the ventilators are partially open, but inasmuch as less moisture is escaping than during the sweating stage, and because of the great draught due to the heat, they are not fully open. Wide-open ventilators mean a large consumption of fuel. If the tobacco has not been primed, but the whole plant hung, the temperature is then increased to 160 degrees or 175 degrees, and continued until the stalk is dry. No moisture must be left in either the mid-ribs or stalk, as this moisture will in time run back into the leaf and result in red streaks.

As soon as the drying is finished and the fires are drawn, the leaf may be rendered pliable by running steam into the room, after which it is taken down and removed to the packing house, where it may be bulked on the curing sticks and handled at a later date.

Turkish tobacco, being light and thin, changes much more rapidly than Virginia leaf (pipe tobacco), and all the stages are of shorter duration. The same high temperatures are not required, and 120 degrees is the highest temperature that we care to use for this type of leaf. The leaf dries rapidly, and the ventilators need never be fully open. The beginner usually makes the mistake of attempting too much. A year or two is required before sufficient experience is acquired to justify the planting of large fields.

The cost of flue-curing barns need not be excessive if the farmer or his assistant does the work, but a builder or contractor expects to make a good profit, and the tenders are often enough to frighten a man out of the tobacco business.

It may interest growers to know that the barn should measure 25 ft. by 30 ft. and 20 ft. high. The cost would be from £30 to £40, and such a barn is sufficiently large of an average crop of 10 acres.

Good tobacco can only be made by good curing, and good curing can come only by experience and close observation.

ALKALINE, ACID, AND NEUTRAL SOILS.

The above terms are thus explained by Mr. J. C. Brünnich, Agricultural Chemist:—

Most of our soils have a neutral reaction, which means that they are neither pronounced acid nor alkaline. Alkalinity in soils is caused by presence of lime salts, and in a few cases, particularly near streams of alkaline bore water, to soda carbonate. A slight alkalinity is favourable, but too much alkalinity may be detrimental to plant life. For this reason alkaline bore waters are not suitable for irrigation, although quite fit for watering of stock. To some extent such alkalinity can be improved by application of gypsum.

Acidity in soil is caused when little or no lime is present in the soil, to neutralise the acidity formed by decaying vegetable matter and the natural acidity of some weathered rocks. Too high an acidity is detrimental, and can be improved by application of lime in form of slaked lime (burnt lime air-slaked).

Capillarity of soil is the physical property which aids in the circulation of water, helps to supply the surface soil with water from the subsoil, and also allows rain water to pass readily through the soil. It depends on the mechanical composition, size of soil grains, &c. Organic matter, humus, will improve capillarity, so will drainage. A well-tilled soil should have a high capillarity, as indicated by the laboratory figure how high (expressed in inches) water will rise in soil after a certain number of hours. A sandy soil has a better capillarity than a heavy clay soil.

Science.

A NEW DIPPING FLUID.

By J. C. BRÜNNICH, F.I.C., and F. SMITH, B.Sc., F.I.C.

The undoubted extra efficiency imparted to arsenical solutions as toxic agents to the cattle tick by the incorporation therewith of tallow or oil soaps and Stockholm tar, has led to the universal adoption of these medicaments as ingredients of cattle dipping fluids—the tar being frequently replaced by commercial phenolic preparations—in all countries where the control of the pest is undertaken, and they are therefore prescribed as adjuncts in the dipping formula under the regulations of "*The Diseases in Stock Acts*, 1896 *to* 1898," of the Queensland Government.

The small amount of tar employed serves to impart a distinctive odour to the fluid, that renders it impalatable to stock and undoubtedly, under favourable conditions, exercises a beneficial and emolient effect upon the animal skin. Recent experiments conducted by us and described in a technical paper* indicate that it acts also as a detergent agent in hard waters, which completely throw any accompanying soap out of solution, a property not shared by simple phenolic bodies.

Tar and phenolic bodies are, however, recognised as promoting agents, especially under the influence of light, of oxidation of the arsenious acid, and consequent loss of effective strength of dips; though a subsequent investigation having shown this to be accomplished also through bacterial agency, and to be combated by action of reducing organisms that find a favourable field for activity in conditions mostly prevailing in fluids in actual use, it has not been possible to invalidate their employment on this ground.

The inclusion of emulsifying agents is necessary for the maximum effectivity of dipping fluids.

Tar and soap are, however, much the highest priced ingredients of dip mixtures, and this fact has, we believe, led to the diminution of the recommended proportions by some manufacturers of concentrates. The high price of these adjuncts, and particularly the difficulty experienced to obtain Stockholm tar of good quality at the present time, determined us to conduct experiments with commercial "bone oil" as a substitute.

"**BONE OIL**" is a bye-produce in the manufacture of bone char, and procurable in sufficient quantities from the sugar refineries operating in Australia. It is a complex material, which found application as a raw material for the manufacture of certain chemicals, and also as an antiseptic dressing in veterinary practice. Experiments showed it to

* J. C. Brünnich and F. Smith. "Factors influencing Efficacy and Deterioration of Cattle-dipping Fluids." "Queensland Agricultural Journal," vol. II., part 1, 1914 page 81.

be in the main readily emulsifiable by boiling with alkali, and the resulting solution possessed marked detergent property and retained this, in common with Stockholm tar, when compounded with hard water.

PRACTICAL TRIAL OF BONE OIL DIP.

From this property it was expected that arsenical solutions of standard strength containing bone oil as an adjunct would prove fully effective in tick destruction, and this supposition was amply borne out in spraying and dipping experiments carried out by permission of Mr. F. Stimpson at his farm at Fairfield.

The fluid used contained bone oil at the rate of 1 gallon to 400 gallons of fluid.

Stock Inspector Carmody, under whose supervision the practical trials were conducted, reports thereon as follows:—

" . . . . . on the seventh day after spraying the cattle were clean. The stock showed no indication whatever of scalding, which is a good feature.

" . . . . . on Wednesday, the 16th February (third day) I examined the cattle and found that most of the ticks were dead; on the 19th instant I again examined the cattle and they were clean. The opinion I have formed on the bone oil is that it is an excellent substitute for tar, as it is not so hot. The stock showed absolutely no ill-effects, and during the test the weather was particularly hot. The stock presented a remarkably clean and sleek appearance."

The trials proved the total efficacy of the bone oil-arsenical dip, and also that the bone oil has a decided beneficial and emolient effect.

The strong, though not objectionable, odour imparted by the oil has been observed to leave dipped animals within twenty-four to forty-eight hours, and it has been definitely ascertained not to communicate noticeable odour or taint to the milk drawn subsequent to dipping from a milking herd.

The relative cost of the chemicals in the new bone oil dip is practically only one-half of those in the old standard dip, and the process of manufacture is very much simplified.

THE PREPARATION OF BONE OIL CONCENTRATE.

Laboratory experiments have shown the following procedure of preparation of a concentrate to be both rapid and easy:—

The required amount of bone oil is heated in an open pan with one quarter of its weight of caustic soda, with stirring. After a quarter of an hour, the mass being still in condition of active frothing, the flame is withdrawn and the arsenic, previously intimately mixed in the dry powder form with a quarter weight of caustic soda, is stirred into the oil in small portions. On partial cooling the mass receives addition of sufficient water to form a soft homogeneous paste, which can be immediately dissolved in more water to produce the dipping fluid ready for use, or can be tinned as a concentrate.

The proportions of constituents recommended are:—

Arsenic, 8 lb. to 8½ lb., according to quality;

Bone oil, 1 gallon (from 9 to 9½ lb.);

Caustic soda, 4 lb.—

To make 400 gallons of dipping fluid.

As a mean of several laboratory trials the following figures may be taken as a guide in preparation of concentrate on a large scale:—

Taken Bone oil	95	parts by weight.
Caustic soda	25	,, ,,
Arsenic	100	,, ,,
Caustic soda	25	,, ,,
TOTAL	245	

After boiling and cooling, the mass weighed 200 parts, so that 50 parts of water were added to make 250 parts of paste, which for final fluids is diluted in the proportion of 1 part of concentrate to 200 parts of water.

PASTE V. FLUID CONCENTRATES.

The new bone oil arsenic concentrate is recommended in paste form, although it could be just as easily made into a fluid concentrate.

Pastes possess a certain disadvantage in comparison with liquid concentrates in being less easily diluted. Our prepared bone oil concentrate was found to rub down to a homogeneous liquid with cold water, but much more readily with hot water, and therefore, for the filling of dips, it is recommended to use hot water where practicable, rubbing portions of paste down to homogeneity with hot water prior to emptying into the dipping bath.

Pastes possess the following advantages:—

(1.) Perfect homogeneity allowing accurate gauging of the amount of arsenic drawn in each aliquote part of the preparation.

It is almost a matter of impossibility to draw off a small amount of fluid from a liquid concentrate and to be sure that it is of right average composition.

(2.) No liability to force and exude from containing vessels, hence permitting employment of lighter and less expensive containers.

(3.) Generally greater concentration and consequent saving of freight.

The paste as prepared has a specific gravity of approximately 1·5; hence the contents of one 4-gallon kerosene tin weigh 60 lb., and will make 1,200 gallons of dipping fluid.

The bone oil-arsenic dip must be admitted to use in officially recognised public dips and dips used for the dipping of travelling stock, on the grounds of efficiency. Its general adoption is urged on account of greater simplicity and ease of preparation, economy in handling, and greatly decreased cost.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

BY F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order CRUCIFERAE.

LEPIDIUM, Linn.

L. fasciculatum, *Thellung.* (Plate 12.) Perennial ?. Stems glabrous, suberect, branching. Leaves glabrous sessile, linear, acute, quite entire, or toothed towards the apex. Flowers small, apetalous, sepals ovate, stamens 2. Fruiting raceme exceedingly short, corymbose-capitate, almost hemispherical. Pods obovate, apex obtuse, rotundate, very slightly emarginate, base narrowed. Seeds narrow-ovoid, compressed.

Hab.: Hermitage, Warwick—One of the commonest weeds in the locality, *C. T. White,* Dec., 1912.

L. sagittulatum, *Thellung.* Perennial ?. Stem erect, glabrous, Leaves quite glabrous, pinnatisect, or the upper ones entire, sessile, the larger ones said to be sagittate-auriculate at the base, but not seen on our specimens. Flowers apetalous. Sepals ovate, with white margins. Stamens 2. Fruiting racemes elongate, rhachis glabrous, stout, striate. Silicule elliptic, rather obtuse at both ends, apex emarginate. Seeds narrowly ellipsoid, compressed.

Hab.: Warwick, *J. R. D. Munro.*

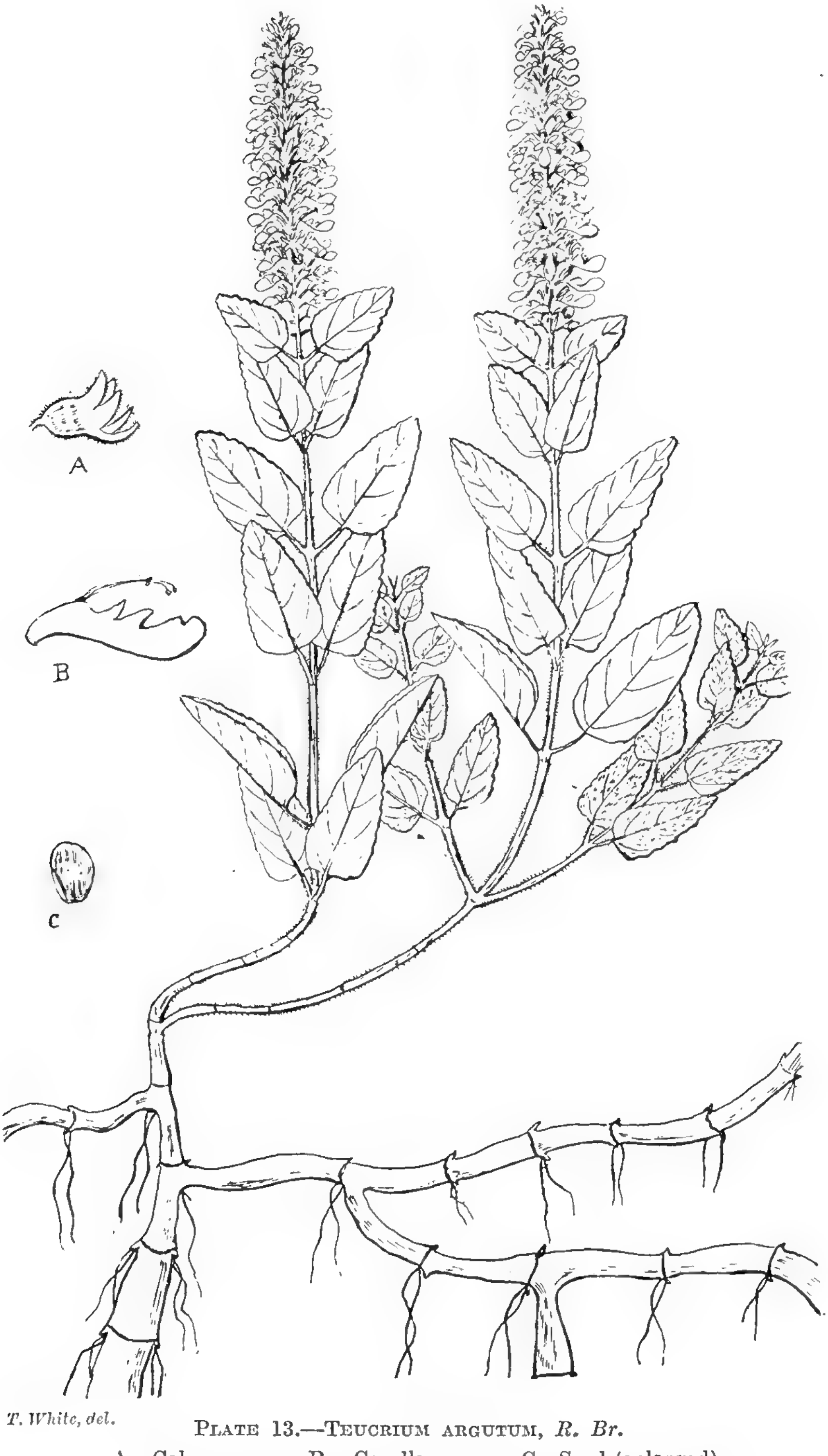
This plant was recorded and illustrated in the "Queensland Agricultural Journal," November, 1913, pp. 318-9, as *L. incisum,* Roth. (?); specimens have since been forwarded to the Royal Botanic Gardens, Kew, England, and determined as belonging to the above species.

Order LABIATAE.

TEUCRIUM, Linn.

T. argutum, *R. Br.* (Plate 13.) Some months ago Mr. W. Brooks brought me a number of long, white, fleshy roots which he informed me were blamed by a farmer, as being harmful to his pigs, making them excited and rush about, though none died; very fragmentary specimens were brought with these, and apparently belonged to the above plant, but insufficient to speak with certainty. When recently in the Eumundi district, my assistant (Mr. C. T. White), seeing quantities of the plant growing as a weed in cultivation areas, dug up several with long, white, fleshy stolons attached at some distance below the surface of the soil; the plant readily grows from small portions of these stolons. A French botanist—L'Abbé H. Coste—speaking of the genus, says all the species are bitter, tonic, and exciting. As this stoloniferous growth seems not to have previously been noted, a figure of the plant is given herewith.

PLATE 12.—LEPIDIUM FASCICULATUM, *Thellung.*



C. T. White, del.

PLATE 13.—TEUCRIUM ARGUTUM, *R. Br.*

A—Calyx. B—Corolla. C—Seed (enlarged).

Order PANDANACEEAE.

PANDANUS, Linn.

P. Cookii, *Martelli.* Webbia, iv., 401 (1914). Leaves thickly coriaceous, from nearly 6 to over 7 ft. long, 3-4 in. broad, gradually attenuated from the base to the apex and ending in a sub-flagelliform point, for a short space deeply canaliculate, the remainder flat, finely veined on both sides, smooth and shining towards the base. Margins in the upper portion unarmed; the lower part dentate with short, acute, remote teeth; middle nerve prominent beneath. Syncarp pedunculate, pendulous, solitary, and oblong, 6-8 in. in diameter and 8-13 in. long. Drupes numerous, in clusters of 9-13 large, about 3 in. long and 2 in. broad, oblong, broadest about the middle, irregularly longitudinally costate, lower part fibrous. Top slightly convex or somewhat flat.

Hab.: Cooktown, *Dempsey.*

P. Dammannii, *Warb.* Pandan. in Engl. Pflanzenr, 4, 9, 49. Drupes in clusters of about 9, almost globose, about 2 in. long and broad, longitudinally sulcate, top somewhat flat, stigma small.

Hab.: Batavia River, North Queensland. (Martelli Enumer, Pandan., Webbia, 4, page ii.)

Order FILICES.

ASPIDIUM, Sw.

Aspidium (Nephrodium) tenericaule, *Sw.* Stipes 1 to 2 ft., frond generally very ample, from 1 to over 4 ft. long, firm membranaceous, 3-4 pinnate, costæ, costules, and veins hirsute with long, soft, silky, spreading hairs, pinnæ on long petioles (especially in the more compound fronds) broad oblong, acuminate, wide apart, ultimate pinnules oblong or lanceolate, more or less decurrent at the base, acuminate or obtuse, pinnatifid with copious oblong entire segments, the margin often reflexed, veinlets simple or forked, generally bearing one small sorus to each small lobe or segment. Involucres cordate-reniform.

Hab.: Burleigh Heads, *J. E. Young.*

The fern now brought under notice is one of which there has been considerable confusion. I have now received a portion of a well-developed soriferous frond from Mr. J. E. Young; and from this I find that the two ferns named—*Polypodium pallidum,* Brack., and *Aspidium tenericaule,* Thwaites—are quite distinct. I had not seen good specimens of the latter until lately; thus in my former publications I had followed others and combined the two species.

MENISCIUM, Schreb.

M. triphyllum, *Sw.* In the "Queensland Flora," p. 1992, I mentioned that I had never seen Queensland specimens of this interesting fern. In removal into new quarters into the Botanic Gardens, I found an old parcel of ferns collected at Cooktown many years ago by Mr. C. C. Harris, in which, among others, were one or two specimens of this rare plant, so I take the opportunity of recording the fact. As this is one of the few Queensland ferns not figured in any of my publications, a plate is given herewith.

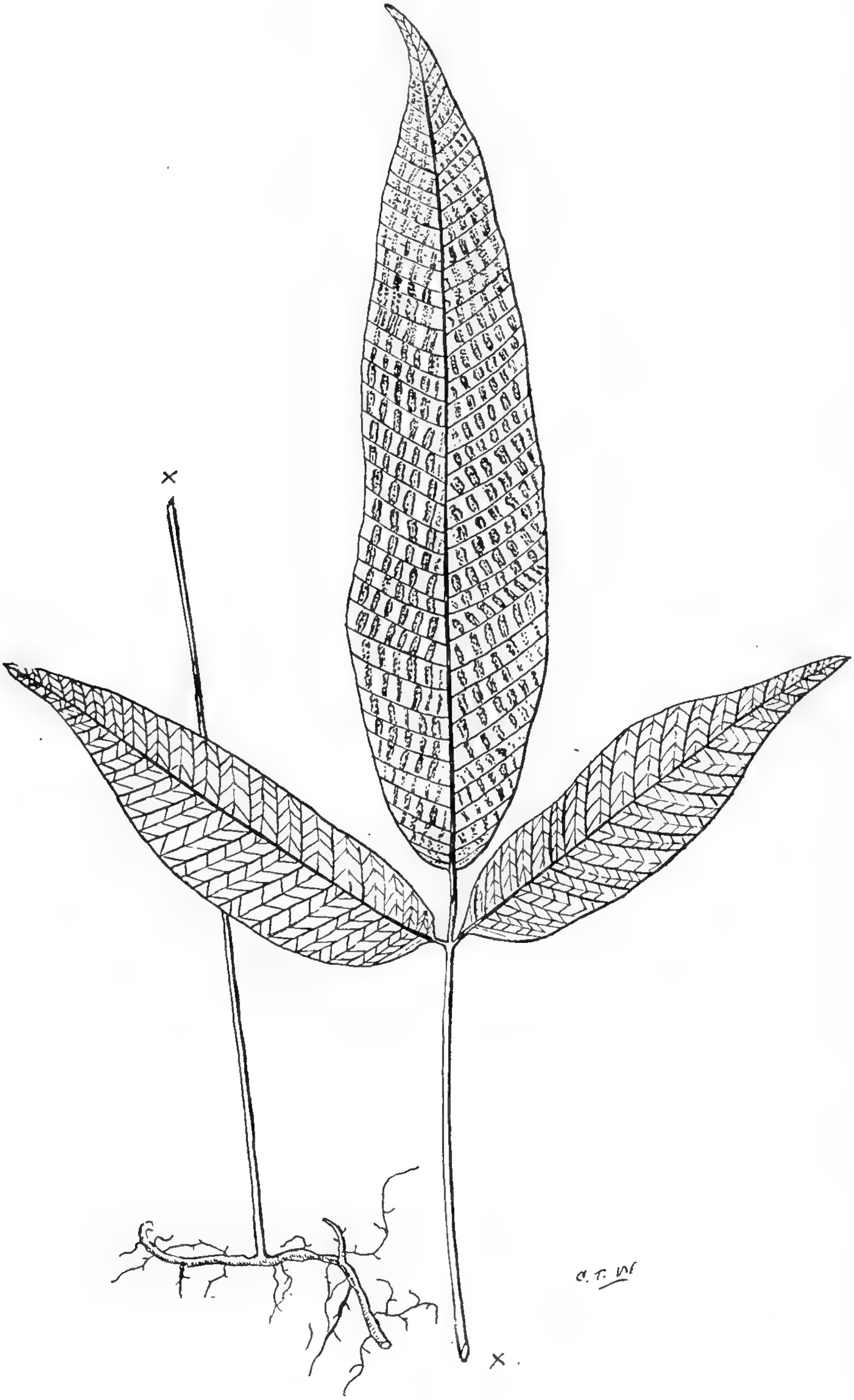


PLATE 14.—MENISCIUM TRIPHYLLUM, *Sw.*

Order FUNGI.

The following additions to our Fungi have been determined by Miss E. M. Wakefield, Royal Botanic Gardens, Kew, England:—

Hymenochaete attenuata, *Lév.*

Hab.: On dead twigs, Southport, *J. H. Simmonds.*

Morchella rotunda (Pers), *Bond,* **var. fulva,** *Krombh.; M. esculenta* (Pers), *var. fulva, Krombh.*

Hab.: Brisbane River (near Indooroopilly), *C. T. White.* A well-known edible European fungus.

Phyllachora stenospora, *P. Henn.*

Hab.: On leaves of *Oplismenus compositus,* Enoggera Creek, *C. T. White.*

Gloeosporium papayæ, *Henn.*

Hab.: On dead and dying petioles of the Papaw (*Carica papaya*), Brisbane (*F. M. Bailey*); and on fruit, Brisbane (*C. T. White*).

Rhinotrichum pulchrum, *Berk.* In May, 1913, my son (J. F. Bailey) brought me a small specimen of this fungus from Dulacca. It forms orange or pink coloured powdery masses on prickly pear sprayed with arsenical compounds. In the report of the Prickly Pear Experiment Station just to hand, Dr. Jean White speaks of its common occurrence and records it as determined by the Kew authorities as the above species.

Sporocybe, sp., *Wakefield.*

Hab.: On dead wood, Southport, *J. H. Simmonds.*

ALGAE.

The following addition to our Algæ have been determined by Mr. A. D. Cotton, Royal Botanic Gardens, Kew, England:—

Sporochnus pedunculatus (Huds.), *Ag.*

Hab.: Bribie Island, *C. T. White.*

Nostoc commune, *Vaucher.*

Hab.: On damp soil, Brisbane River (near Indooroopilly), *C. T. White.*

A SOURCE OF POTASH.

In a few weeks vignerons will be pruning their vines, and we would draw their attention to the great value of the prunings as a manure. The ash is particularly rich in potash, and is consequently an excellent manure for various crops, especially potatoes, tomatoes, &c., and even for the vines themselves. In France, Germany, and Switzerland the vine cuttings are regularly used for this purpose, being sometimes chopped small and dug in round the vines. All rubbish should be collected and burnt for the sake of the potash contained in the materials.

General Notes.

TO REMOVE WARTS IN CATTLE.

With reference to the remedy published in the February issue of the Journal, for the removal of warts on young stock, Mr. H. L. Tait, of Yaamba, says that he has tried a remedy which he has proved to be a sure cure if applied regularly about every ten days. This consists of one-half lb. of Stockholm or coal tar mixed with about half an ounce of arsenic, applied to the warts with a brush or bundle of feathers. For blight in the eyes of cattle he has found sugar of lead to be a good cure. A first application when the trouble is noticed, followed by another three days later, and another after eight days, suffices to effect a cure.

CALCIUM CARBIDE FOR WHITEWASH.

The carbide waste is reduced to calcium hydrate (slaked lime). It will make an excellent paint or wash for outside work—wood or iron. If 1 quart of boiled linseed oil is mixed with 10 gallons of the water used in making the paint, it will then be fairly weather-proof.

NOTES ON THE CONSTRUCTION OF A BOWLING-GREEN.

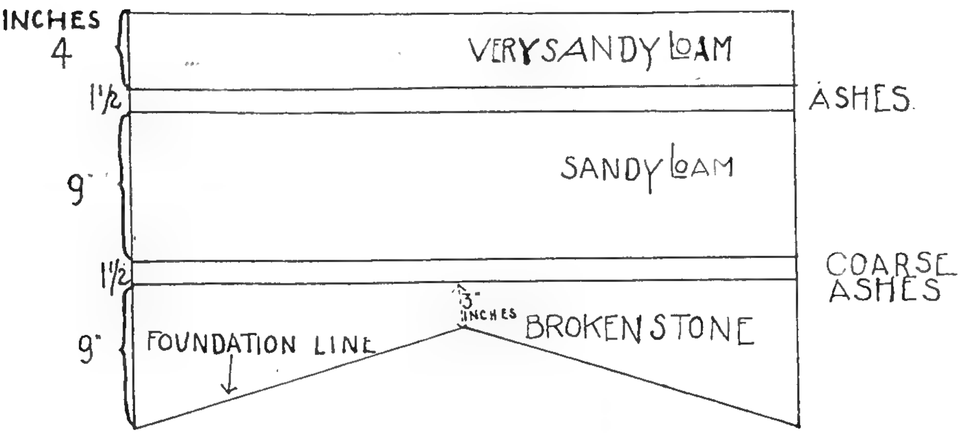
By W. SCOTT.

Considerable interest has been taken in the instructions we gave in the September issue of the Journal (1914) for laying down a bowling-green. For the further information of our correspondents we publish, in this issue, instructions by Mr. W. Scott, a well-known authority on the game of bowls and the construction of a green.

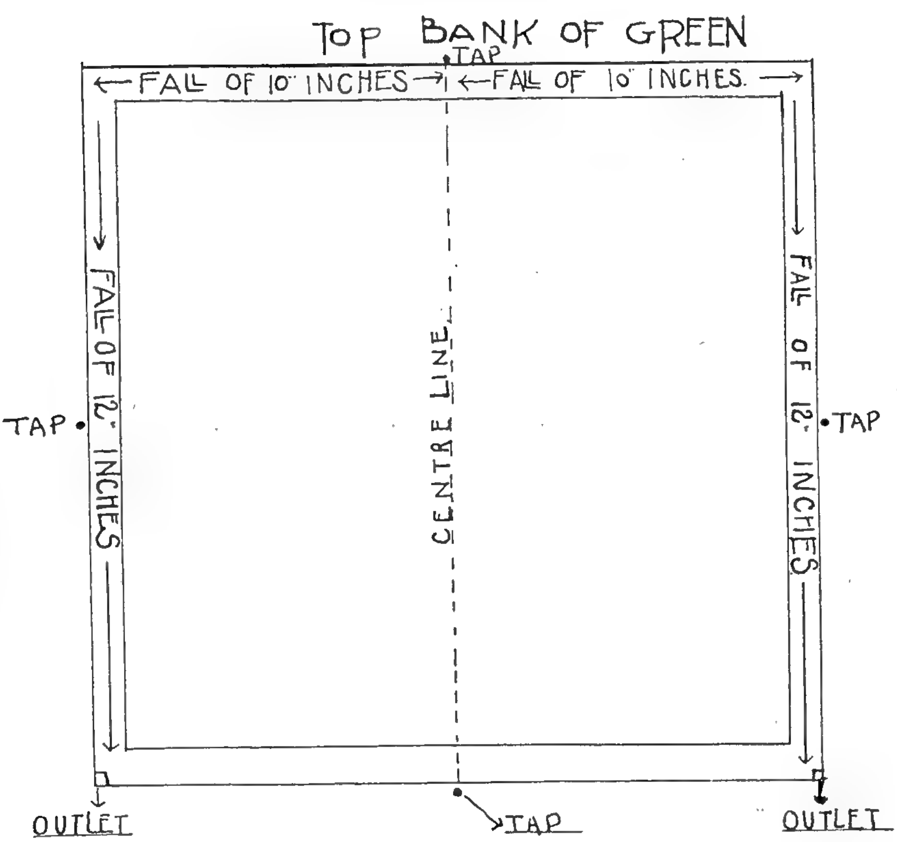
SIZE OF THE GREEN AND DIVISION INTO RINKS, DITCHES, AND BANKS.

The playing area of the green shall be not less than 110 ft. or more than 120 ft. in length, and shall be divided into spaces called rinks, not less than 17 or more than 20 ft. in width (except that, on a ditch rink, there shall be at least 9 ft. 6 in. between the middle peg and the ditch), the centre of each rink being marked on the bank at each end and numbered consecutively, and the four corners of the rink by a perpendicular white pin, or white mark, not less than ½ in., or more than 1 in. in diameter, or width, respectively, and not less than 18 in. long, driven into the bank (not into the ditch). That the outside of the pegs or marks shall be the boundary of a rink.

CROSS SECTION OF GREEN



DITCHES



At the end of the green must be a ditch. All ditches must not be less than 6 in. or more than 8 in. below the level of the green, and not less than 6 in. in width, clear of all obstructions.

The end banks shall be perpendicular, and not less than 9 in. above the level of the green. Such banks shall be constructed in such a manner as not to damage a bowl striking them.

Excavate to 3 ft. 4 in. below the level of the lowest of the four banks, so that at the centre line the bed is 6 in. higher than at the ditch on either side.

Level the bed by applying a layer of broken metal (stone) 3 in. deep at the centre line, increasing to 9 in. at the sides.

Apply over all 1½ in. of coarse ashes (for drainage); over that, 9 in. of soil (sandy loam); then, another 1½ in. of coarse ashes; and, over that, 4 in. of soil (very sandy loam). On this, plant couch grass—ordinary couch; not blue. Top dress with sandy loam. Use fertiliser in the top dressing—one bag per rink, bonedust being preferable to anything else.

In constructing the ditches, there must be on the foundation a fall of 10 in. from the centre of the top bank side to the near corner on either hand, and a further fall of 12 in. from that corner down either side of the green to outlets at the other corners, all being made level by filling in with stone up to 6 or 8 in. below the level of the green.

A tap for watering to be at the middle of each of the four sides.

MEMO.—Gutter to be taken out after the foundation is formed, and the fall to be given.

TO DESTROY YOUNG GUAVA TREES.

The root system of the guava is so strong that eradication is extremely difficult. In small patches poisoning with a strong arsenic solution, say, 1 lb. of arsenic, ½ lb. of caustic soda, dissolved in 1 gallon of water, and applied in cuts near the root of the suckers, may be tried, but it is very doubtful if the whole root system is destroyed.

Answers to Correspondents.

POTASH SUPPLY.

Potash may still be obtained in complete fertilisers from dealers, but it cannot be purchased by itself. In the meantime, dressing the soil with lime in form of limestone screenings will liberate potash in the soil. There is no substitute for potash in manures.

PINEAPPLES AND MEALY BUGS.

G.E., Nambour—

The specimen of pineapple received is infested with mealy bugs. Pineapples, both fruit and plants, are subject to the attacks of those insects at the base of the leaves and surface roots. They are not likely to do any serious injury, but they give the fruit a dirty appearance. The infestation may be controlled by spraying with tobacco water.

PLANTING SEASON FOR PINEAPPLES AND CITRUS TREES.

E.W.B., Green's Creek, Gympie—

The best season to plant pineapples is from September to March; citrus trees, February to August.

The following varieties of oranges are suitable for the district:—White Saletta, Sabina, Mediterranean Sweet, and Late Valencia; of mandarins, Scarlet Emperor, Canton, and Beauty of Glen Retreat.

CANARY SEED.

Replying to a correspondent at Burpengary on the subject of canary seed, Mr. H. C. Quodling, Inspector of Agriculture, says:—

1. Q. Is the seed the same as used for bird feed? A. Yes.

2. Q. The quantity to sow per acre broadcast. A. Drilling is more satisfactory; 14 lb. per acre drilled; 25 lb. per acre broadcast.

3. Q. The method of cultivation (seed being small) as to harrowing, if ordinary harrow or brush harrow to be used. A. Fine seedbed essential. Lever harrows superior to brush harrows for covering seed.

4. Q. Has the Department any of the seed for sale? A. No. Try Walch and Co., Toowoomba. Correct name, *Phalaris canariensis.*

If you find it necessary to harrow in seed, it may be advisable to lightly roll the surface to induce moisture to rise, by capillary attraction, to induce seed to germinate.

GROWING CITRUS FRUITS.

ORCHARDIST, North Isis—

In reply to your questions on the subject of citrus fruit growing, Mr. C. Ross, Instructor in Fruit Culture, says:—

"Eighteen feet is ridiculously close for the planting of citrus trees. The disadvantages of close planting are as follows:—

1st.—Not giving sufficient room for horse labour with regard to thorough cultivation.

2nd.—Pests and diseases are more likely to occur.

3rd.—Root systems intermingling with each other, larger quantities of fertilisers are required.

4th.—Susceptibility to climate changes is accentuated, and much fruit dropping is caused by drought.

5th.—Neither weight nor quality is increased.

6th.—Want of vigour and fruitfulness as trees become aged; consequently a shorter duration of existence is highly probable.

"The only advantage of close planting I know of is the probability of more fruit on a given area during the first two years of bearing.

"I recommend planting on such soil as described, and in your locality (Mount Mee) at not less than 25 ft. apart. At this, or a greater distance, a bed (a double row) of pineapples could be grown between the rows of trees for the first three years, or such crops as tomatoes, potatoes, beans, &c., allowing plenty of room for horse cultivation alongside the trees. If such crops are grown, fertilisers must be liberally supplied so that the trees are not robbed of their proper sustenance. The following is a suitable list of citrus fruits, viz.:—

Oranges: Sabina, Mediterranean Sweet, White Siletta, Jaffa, Joppa, Valencia Late.

Mandarins: Beauty of Glen Retreat, Emperor, Scarlet.

Lemons: Sweet Rind, Lisbon, Villa Franca, Messina.

Limes: Tahiti.

"Planting operations may commence at once or as soon as the summer growth is properly lignified and continued until August. Autumn, however, is the best season. I prefer worked trees, although seedlings are of stronger constitution and more robust, but the bearing habit is deferred to some years later. It would be safe to plant them as breakwinds, and they are very profitable when aged. Many old seedlings in the State give wonderful annual records. My advice is to order at once, and any of our Queensland nurserymen can supply.

"I do not, as a rule, advise planting other fruit trees in conjunction with citrus fruits for fear of breeding and prolonging the fruit-fly pest; but if desired, a restricted number of the following may be planted (isolated if possible) for home use, viz.:—Figs, persimmons, goose plums, cooking pears, and two or three apples."

DEVIL GRASS OR GIANT COUCH.

From the description furnished it is evident that the grass in question will be eradicated only by ploughing, harrowing, and burning up all the grass that can be collected, and by keeping the plough going at right angles to the previous ploughing.

This grass is readily propagated from portions of the stem, and if left undisturbed in moist soil soon forms a dense matted growth.

Smothering crops are to be preferred to "hoed" crops, should it be possible to get the land fairly clean. Japanese millet can be sown up till the end of this month.

It would be best to sow the seed broadcast, using up to 25 lb. of seed per acre.

ARSENIC SOLUTION FOR DESTROYING WEEDS.

Weak arsenical solutions have been used for the destruction of weeds in banana and sugar plantation for some time, and so far no injurious results to crops have been observed. There is no doubt that the continued and repeated use of such sprays will lead to an accumulation of arsenic in the soil, and we have, so far, no data to know when a dangerous amount which would injure the crop itself is reached. From past experience it appears as if the arsenic which is applied in a soluble form, as soon as it reaches the soil, is changed into an insoluble form, as indicated by the fact of the weeds growing again after a short time, but it is quite possible that, by other changes, this arsenic may become soluble again and then injure the plants. There is always some risk in using this method.

GOAT'S MILK AND CHEESE.

C.W.M., Mackay—

1. The cream can be separated from goat's milk by the ordinary separator.

2. There is no quick and simple method of making a nourishing and palatable cheese from the milk of the goat.

In some countries the milk of the goat is utilised in limited quantities for making a variety of cheese which is consumed promptly after its manufacture, but the process cannot be successfully followed in Northern Queensland, where the climatic conditions are adverse to the conversion of milk into cheese, unless in instances where the operations are conducted in efficiently equipped premises and the manipulator of the milk possesses a sound knowledge in both the theory and practice of the work.

It is extremely doubtful whether a sufficient quantity of goat's milk is available in any part of Queensland to command either of the above essentials.

MANURES FOR RED SOILS.

A.B., Wellington Point—

Superphosphates, or, as sometimes called, acid phosphates, are not very suitable for red soils, as they rapidly change into insoluble phosphates. For this reason Thomas's phosphate or basic slag is recommended to be used in preference, but about one-third more has to be used. If, for instance, 3 cwt. superphosphate is recommended, use 4 cwt. basic slag. Nitrogen is best applied in form of dried blood, or again in form of nitrate of lime, or of nitrolim.

Nitrate of lime and nitrolim are best applied as top dressings, whereas dried blood can be mixed with other manures immediately before being applied. In red soils, bone meal is also found to be very effective, and can be used as a change in alternate seasons instead of basic slag. These remarks apply equally to bananas, pineapples, tomatoes, and strawberries.

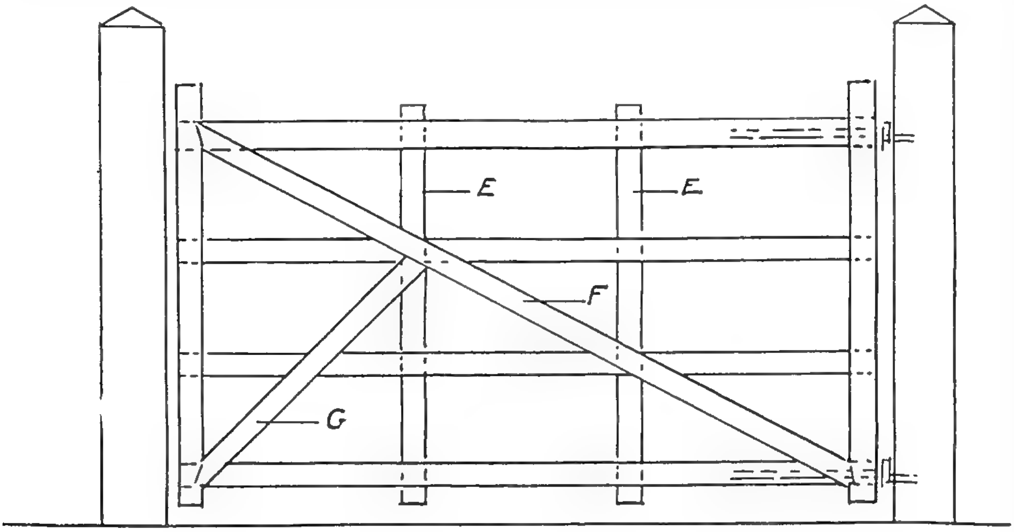
An application of limestone screenings at the rate of 1 to 2 tons per acre every three years will also be found very beneficial, particularly now when potassic manures are getting scarce.

FARM GATE.

E. BAKER, Cairns—

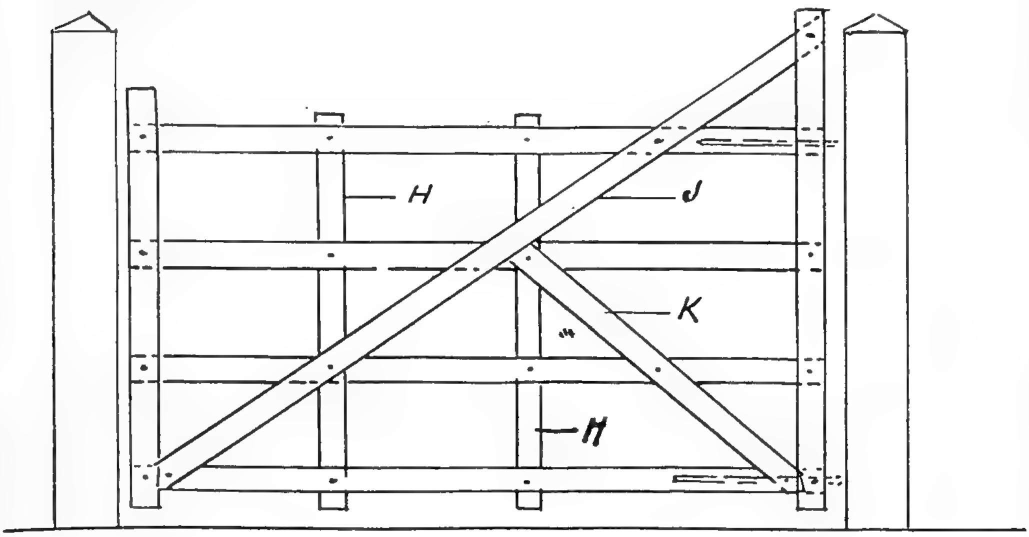
In response to your inquiry *re* gates, Mr. A. Morry, surveyor to the Department of Agriculture and Stock, furnishes the accompanying diagrams and note:—

"In order to better explain this, I have prepared the accompanying diagrams, which illustrate a type of gate very frequently used on account of the ease with which it may be constructed.



—PLAN. A.—

"The head and heel of the gate in each case are made double, 4 in. or 5 in. by 1 in., or, if for rough usage, 1¼ in. thick each; the rails are simply bolted, and in plan A the brace is in compression—that is, the weight of the gate is transmitted by the brace to the lower part of the heel or hanging stile; the brace should be checked into the head at the top and into the heel at the bottom, so as to take the weight off the bolts. This method is quite correct in theory, but is not to be recommended in practice, as the whole of the weight is carried on one side; the stiffeners EE and the short brace G will deviate this defect, and the gate will be durable in this way: It would be better still to omit EE and make F and G double, or omit EE and G and place another brace on the opposite side similar to F, but in the opposite direction; this is the strongest method, as the gate is then braced both in compression and tension. Plan



—PLAN. B.—

B shows a method frequently met with; the brace is in tension throughout—that is, the weight of the gate is suspended from the top of the heel or hanging stile. HH are intended as stiffeners to the bars, and K is a short brace which will be in compression, as a portion of the weight is transmitted by its means to the bottom of the heel. This is also correct in principle, but would be improved, as in plan A, by having a cross brace on the other side in compression and omitting HH and K.

HEAVIEST COB OF MAIZE.

E. A. Hoffmann, Guluguba—

Competitions at shows are usually for twelve heaviest ears of maize, and we have not any record of a single cob competition by way of answering your question.

INFLORESCENCE OF THE PAPAW TREE.

M.M., Woombye—

It is not unusual for the inflorescence or fruit to be produced in the manner you describe. You are acting wisely in thinning out the fruit. The bleeding will cause no harm to the tree.

FEEDING CALVES.

Linseed meal, "Sunlight" oil cake, pollard, cotton seed meal, and maize meal may be added to skim milk for the purpose of feeding calves. The meals may be first prepared by mixing with boiling water until a thick paste results, and from one-half pint to one pint of the paste added to each gallon of milk intended for calf-feeding purposes.

SHRINKAGE OF MAIZE IN STORE.

The Agricultural Department has no actual records of shrinkages. American authorities state that the loss by drying is estimated in America at 15 per cent., but it varies with different varieties. Yellow Dent will lose 21 per cent. of the original weight. According to the degree of drying before storage or shipment, the loss in weight ranges from 3 to an extreme of 30 per cent. in four and a-half months.

INOCULATION OF STOCK.

A. R. GORDON, Tiaro—

Your letter of 27th February was referred to Mr. A. McGown, Government Veterinary Surgeon, who writes:—

"I should advise immediate inoculation of all stock.

"1. There is no danger in mixing uninoculated stock with inoculated ones.

"2. One cannot say that there will be no deaths, but the number should be very small if inoculation is properly carried out.

"3. Cattle sick from inoculation should be kept under observation until the period has elapsed.

"4. There will be no feverish symptoms set up. A rise in temperature from 101 degrees (normal) to 104 or 105 degrees.

"Some may show a swelling at the tip of the tail, while others may swell right up to the rump. These symptoms usually disappear in from ten to fourteen days. If the swelling is very severe and travelling right up the tail, it is often advisable to amputate the tail immediately above the swelling."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1915.

Article.		MARCH. Prices.
Bacon	lb.	11½d.
Bran	ton	£8 10s. to £9
Butter	cwt.	120s.
Chaff, Mixed	ton	£5 10s.
Chaff, Oaten	"	£7 to £8
Chaff, Lucerne	"	£4 15s. to £5 10s.
Chaff, Wheaten	"	£4 to £4 10s.
Cheese	lb.	9d. to 10d.
Flour	ton	£17 10s.
Hams	lb.	1s. 2d. to 1s. 3d.
Hay, Oaten	ton	£8 10s. to £9
Hay, Lucerne (Prime)	"	£5 10s.
Honey	lb.	2d. to 3d.
Maize	bush.	4s. 6d. to 5s.
Oats	"	4s. 9d.
Onions	ton	£7 to £9
Peanuts	lb.	3d. to 3½d.
Potatoes	ton	£5 to £7
Potatoes (Sweet)	cwt.	3s. 6d. to 4s. 6d.
Pumpkins	ton	£3 10s. to £4
Eggs	doz.	10½d. to 1s. 9d.
Fowls	pair	3s. 6d. to 5s.
Ducks, English	"	2s. 6d. to 3s. 3d.
Ducks, Muscovy	"	4s. to 5s.
Turkeys (Hens)	"	8s. to 9s.
Turkeys (Gobblers)	"	11s. to 15s.
Wheat	bushel	7s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	MARCH. Prices.
Bananas (Queensland), per case	8s. to 10s.
Bananas (Fiji), per case	22s. to 22s. 6d.
Bananas (G.M.), per case	...
Mangoes, per case	4s. to 10s.
Oranges (Navel), per case	15s. to 16s.
Oranges, Italian (Seville), per case	
Oranges (Other), per case	
Passion Fruit, per half-case	2s. to 9s.
Papaw Apples, per half-case	1s. 6d. to 2s. 6d.
Pineapples (Queens), per case	3s. to 6s.
Pineapples (Ripleys), per case	4s. to 5s.
Pineapples (Common), per case	4s. to 5s.
Tomatoes, per quarter-case	3s. to 5s.
Persimmons, per half-case	3s. 6d. to 4s.
Rockmelons, per double case	3s. to 5s.
Watermelons, per dozen	4s. to 12s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MARCH. Prices.
Apples (American), Eating, per case	8s. to 9s.
Apples (Local), per case	3s. to 6s.
Apples, Cooking, per case	...
Apricots, per quarter-case	4s. to 5s.
Bananas (Cavendish), per dozen	1d. to 2½d.
Bananas (Sugar), per dozen	1d. to 2½d.
Cape Gooseberries, per quarter-case	...
Cherries, per quarter-case	...
Cocoanuts, per sack	12s. to 15s.
Cumquats, per case	...
Custard Apples, per quarter-case	...
Lemons (Local), per case	5s. to 6s.
Lemons (Italian), per case	12s.
Limes, per case	...
Mandarins, per half-case	...
Mangoes, per quarter-case	1s. 6d. to 4s.
Nectarines, per quarter-case	2s. 6d. to 4s. 6d.
Oranges (Japanese Navel), per case	...
Oranges (other), per case	...
Papaw Apples, per quarter-case	1s. 6d. to 2s. 6d.
Passion Fruit, per case	2s. 6d. to 5s.
Peaches, per quarter-case	2s. 6d. to 5s. 6d.
Peanuts, per pound	3½d.
Pears, per case	9s. to 12s.
Persimmons, per quarter-case	1s. to 2s. 6d.
Pineapples (Ripley), per dozen	9d. to 3s. 6d.
Pineapples (Rough), per dozen	8d. to 3s.
Pineapples (Smooth), per dozen	1s. to 2s. 6d.
Plums, per case	3s. to 4s.
Rockmelons, per dozen	7s. to 8s.
Rosellas, per sugar bag	...
Strawberries, per tray	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	1s. to 3s. 3d.
Watermelons, per dozen	4s. to 12s.

VEGETABLES.

Peas	per sugar bag	7s. to 10s. 6d.
Cabbages (Prime)	per dozen	5s. to 12s.
Beans (Prime)	per sugar bag	6s. to 9s.
Parsnips and Carrots	per dozen bunches	1s. 9d.
Cucumbers	per dozen	1s. to 1s. 6d.
Custard Marrows	"	4d. to 9d.
Vegetable Marrows	"	3s. to 5s. 6d.
Beetroot	per dozen bunches	1s. to 1s. 3d.

TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1915.

Animal.	FEBRUARY. Prices.
Bullocks	£13 2s. 6d. to £15 17s. 6d.
Cows	£10 5s. to £12 15s.
Merino Wethers	21s. 3d.
Crossbred Wethers	25s.
Merino Ewes	16s. 3d.
Crossbred Ewes	20s.
Lambs	18s. 9d.
Pigs (Porkers)	41s.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall. Feb.	Average Rainfall. No. of Years' Records.	Total Rainfall. Feb., 1915.	Total Rainfall. Feb., 1914.
North Coast.	In.		In.	In.
Atherton	10·56	13	2·94	7·27
Cairns	14·73	27	5·56	17·42
Cardwell	16·27	27	4·92	15·25
Cooktown	11·92	27	11·00	17·02
Herberton	7·59	27	2·01	6·68
Ingham	15·74	22	8·05	17·84
Innisfail	21·78	27	13·04	21·05
Mossman	16·47	5	4·41	18·23
Townsville	12·02	36	2·81	4·76
Central Coast.				
Ayr	10·03	27	0·39	3·15
Bowen	9·15	27	2·39	3·91
Charters Towers	4·21	27	0·95	0·97
Mackay	12·43	27	8·99	4·41
Proserpine	10·95	11	9·13	12 66
St. Lawrence	8·70	27	6·68	4·64
South Coast.				
Biggenden	3·72	14	6·10	4·27
Bundaberg	6·56	27	12·81	3·40
Brisbane	6·58	64	8·17	3·20
Childers	5·80	19	10·04	6·34
Crohamhurst	15·80	23	19·35	22·05
Esk	6·00	27	7·44	4·46
Gayndah	4·31	27	2·26	2·85
Gympie	6·84	27	8·26	6·83
Glasshouse M'tains	8·80	6	11·84	23·94
Kilkivan	5·62	27	3·85	3·85
Maryborough	6·72	27	7·66	11·95

Divisions and Stations.	Average Rainfall. Feb.	Average Rainfall. No. of Years' Records.	Total Rainfall. Feb., 1915.	Total Rainfall. Feb., 1914.
South Coast—continued:	In.		In.	In.
Nanango	4·93	27	4·12	3·36
Rockhampton	8·31	27	9·03	2·77
Woodford	9·56	27	15·59	10·32
Yandina	12·66	21	13·97	13·37
Darling Downs.				
Dalby	2·91	27	1·41	0·69
Emu Vale	2·28	17	0·56	5·54
Jimbour	3·72	24	0·37	0·90
Miles	2·80	27	0·70	1·38
Stanthorpe	3·19	27	0·43	1·80
Toowoomba	4·72	27	4·01	4·15
Warwick	3·23	27	0·14	0·59
Maranoa.				
Roma	3·14	25	0·14	6·91
State Farms, &c.				
Gatton College	3·35	14	3·98	2·53
Gindie	2·34	13	0·42	3·32
Kamerunga Nurs'y	14·84	23	5·55	17·95
Kairi	...	...	1·33	9·57
Sugar Experiment Station, Mackay	9·95	16	7·51	5·55
Bungeworgorai	...	...	0·33	5·92
Warren	...	...	4·84	1·50
Hermitage	3·08	7	0·15	0·71

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

Date.	January.		February.		March.		April.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·57	6·45	5·22	6·42	5·42	6·19	5·58	5·45
3	4·58	6·46	5·23	6·41	5·43	6·18	5·59	5·44
4	4·58	6·46	5·23	6·41	5·44	6·17	5·59	5·43
5	4·59	6·47	5·24	6·40	5·45	6·15	6·0	5·42
6	4·59	6·47	5·24	6·40	5·45	6·14	6·0	5·41
7	5·0	6·47	5·25	6·39	5·45	6·13	6·1	5·40
8	5·1	6·47	5·26	6·38	5·46	6·12	6·1	5·39
9	5·2	6·47	5·27	6·37	5·46	6·11	6·2	5·38
10	5·3	6·47	5·28	6·36	5·47	6·10	6·2	5·37
11	5·3	6·47	5·29	6·36	5·47	6·9	6·3	5·36
12	5·4	6·47	5·30	6·35	5·48	6·8	6·4	5·34
13	5·5	6·47	5·30	6·34	5·48	6·7	6·4	5·34
14	5·6	6·47	5·31	6·34	5·49	6·6	6·4	5·33
15	5·7	6·47	5·32	6·33	5·49	6·5	6·5	5·32
16	5·8	6·47	5·33	6·32	5·50	6·4	6·5	5·31
17	5·9	6·47	5·34	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·51	6·2	6·6	5·29
19	5·11	6·46	5·35	6·29	5·52	6·0	6·7	5·28
20	5·12	6·46	5·36	6·28	5·53	5·59	6·8	5·27
21	5·12	6·46	5·36	6·28	5·53	5·58	6·8	5·26
22	5·13	6·45	5·37	6·27	5·53	5·57	6·9	5·25
23	5·14	6·45	5·37	6·26	5·54	5·56	6·9	5·24
24	5·15	6·45	5·37	6·25	5·54	5·55	6·10	5·23
25	5·16	6·44	5·38	6·24	5·54	5·54	6·10	5·22
26	5·16	6·44	5·38	6·23	5·55	5·53	6·11	5·21
27	5·17	6·44	5·39	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5·56	5·51	6·12	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·57	5·49	6·13	5·18
31	5·21	6·43	...	...	5·58	5·48	...	...

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H. M.
1 Jan.	○	Full Moon	10 20 p.m.
9 „	☽	Last Quarter	7 12 a.m.
16 „	●	New Moon	12 41 „
23 „	☾	First Quarter	3 32 p.m.
31 „	○	Full Moon	2 41 „

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

7 Feb.	☽	Last Quarter	3 11 p.m.
14 „	●	New Moon	2 31 „
22 „	☾	First Quarter	12 58 „

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

2 Mar.	○	Full Moon	4 32 a.m.
8 „	☽	Last Quarter	10 27 p.m.
16 „	●	New Moon	5 42 a.m.
24 „	☾	First Quarter	8 48 „
31 „	○	Full Moon	3 38 p.m.

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

7 Apr.	☽	Last Quarter	6 12 a.m.
14 „	●	New Moon	9 36 p.m.
23 „	☾	First Quarter	1 39 a.m.
30 „	○	Full Moon	12 19 „

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1·36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Farm and Garden Notes for May.

FIELD.—During this month the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now in this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Growers are notified that Messrs. Kitchen and Sons, in the Valley, Brisbane, and Messrs. Joyce Brothers, of Ipswich, are buyers of seed cotton, so that a sure means of disposing of the crop is available. Every effort should be made to ensure feed for stock during the winter, by utilising all kinds of green fodder, in the form of ensilage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to the climate and to their particular district and soil. A few acres of artificial grass will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West, as has been proved at Barcaldine, will carry 10 or 12 sheep to the acre. Coffee-picking should now be in full swing, and the berries pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Hautbois, and Trollope's Victoria. The Aurie is the earliest, and the Marguerite next. In some localities strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

KITCHEN GARDEN.—Onions which have been planted in seed beds may now be transplanted. The ground should have been thoroughly cleaned, pulverised, and rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these, as well as of peas, broad beans, kohl-rabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

FLOWER GARDEN.—Transplanting and planting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, penstemons, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs, such as anemones, ranunculus, snowflakes, freesias, ixias, iris, narcissus, &c. Tulips and hyacinths may be tried, but success in this climate is very doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip edges and edgings.

Orchard Notes for May.

THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this is done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then when the hole has been dug and

the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free sandy loams that are naturally scrub, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—may be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the "Southern Coast Districts" being equally applicable here.

THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as, although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district grow a crop of blue or grey field peas or a crop of vetches between the trees in the older orchards as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate or fine bone dust, per acre; the crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit—scabby, warty, or otherwise unsightly fruit—is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruit and the work of the orchard generally, made when dealing with the Coast Districts, apply equally well here, especially as regards handling the crop and keeping down pests.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. III. MAY, 1915. PART 5.

Agriculture.

STATE AID TO AGRICULTURE IN GERMANY AND IN QUEENSLAND.

A few years ago a consular report was issued by the British Foreign Office showing the causes which have enabled German agriculture to fight against depression so much more successfully than British rural industry. Some of those burdens which press so heavily on the latter are, or rather, were, previous to the present disastrous war, unknown in Germany, while at the same time her farmers enjoyed the benefit of protection, which, however mischievous in its general effects, undoubtedly answers its purpose in the case of those for whom it is primarily intended. The British consul at Düsseldorf on the Rhine agreed with the German authority who drew up the report in attributing the most salutary effects to fair freights and moderate protection. Other causes also have contributed very largely to the same result, but that is not saying that these alone, without the other two, would have enabled the German farmer to prosper as he did.

In Germany State aid has been carried out on a scale wholly unknown in Great Britain and her dependencies. The State founded Agricultural Colleges at many of the old Universities, and where there are no colleges there is a Chair of Agriculture, with professors to lecture on the subject. Thus an amount of scientific knowledge has been disseminated among the German farmers which has qualified them to cope with the dishonesty of many dealers in cake, meal, seed, and mineral manures in that country: has taught them how to feed their stock so as to produce either meat,

milk, or muscle; and what quantities of nitrogen, phosphates, and potash a crop needs and which must be replaced. In Germany it is assumed that the British farmer is deficient in this kind of knowledge. If so, it is much to be deplored, since he can buy all mineral manures, cakes, and meal more cheaply than his Continental rivals. While plenty of scientific agricultural knowledge exists in Britain and in her oversea dominions, it does not appear to be generally diffused, but sticks fast somewhere amongst the wealthier and more highly educated farmers.

It is not, however, only the Agricultural Colleges at the Universities to which our attention is directed. By means of schools established all over Germany, and maintained or subsidised by the State, agricultural science is brought home to the peasant farmer, and there are special schools for the training of farmers' sons. There are dairy and farriery schools. One of the greatest of German institutions is the State Experimental Station, of which there are several, established for the purpose of making experiments of all kinds, and for testing fodder, manure, seeds, &c., for farmers, at quite a nominal fee. There are also some private establishments of the same kind, but the greater part are subsidised by the State.

Even local Chambers of Agriculture receive State assistance, and travelling lecturers are supported by the Government. Then, as to co-operation. Even more importance is attributed to the principle of co-operation than to State education. Co-operation is the German farmer's stronghold and bulwark, and he means to stand by it. It is of various kinds. There are co-operative credit banks, co-operative dairies, co-operative steam ploughs, and co-operative drainage and irrigation. This co-operative operation has proved to be the key to success in Germany, and has saved many thousand farmers from ruin. The banks conducted on this principle enable farmers to obtain loans on personal security only, the collective guarantee of all the members or depositors being considered sufficient. Wealthy banking firms and rich capitalists were all willing enough to lend money on real estate if sufficient security was forthcoming, but personal credit is what German farmers wanted. It is indispensable to buy stock, mineral manures, cake, meal, seed, tools, machinery, and to pay wages—in short, to run the business. All the union requires is the co-operative guarantee of the members of the co-operative society, a body of men of recognised standing. As all the members are personally acquainted with each other, the risk is next to nothing. That the system is a sound one seems to be proved by the results of the audit. So far back as 1897, the auditors reported that of 649 banks in Würtemberg, 450 were thoroughly satisfactory, 192 were satisfactory with room for improvement, and only seven were unsound. In Germany, the Government, by having the management of the railways in their hands, are able to arrange an equitable system of freightage, while, thanks to the co-operative principle, the farmer can avail himself of the lowest freights on all the materials he requires, and on all products sent to market, by loading in quantities of at least one ton. Under this system preferential rates in Germany are an immense advantage to the farmer, whereas in England they are dead against him,

the advantages there being reaped by his foreign competitor. How much longer, in view of the present war, this ancient industry will retain its position in Germany seems very uncertain. It is already beginning to yield to time and fate and the competition of the New World. A large proportion of the land is in the hands of peasant proprietors. Some of it is let, as in England, and a considerable extent, the property of the nobility, is farmed by the owners. The proprietor cultivates his estate with the labour of the peasantry, who are practically *ascripti glebæ,* receiving only a small modicum of wages in cash, and the rest in kind, being boarded and lodged at the landlord's expense. It would seem that if the proprietors in Great Britain chose to do the same thing, and to work as hard as the Germans, they might not only improve their financial position, but regain much of their former influence. In Germany, though the fall in rents during the past few years would indicate a decline in the returns from agriculture, this class of proprietors make their own rents and appear to thrive. They (we write as matters stood before the war) live the life of an English country gentleman. But the exodus of the farm labourers commenced in Germany many years ago. German vessels, so far back as 1860, brought hundreds of German labourers to Queensland, whose descendants to-day are prosperous colonists, the more profitable industries in America and Australia drawing them from their native fields. Hence, the supply of farm labour in Germany has been yearly growing more scanty. Men are imported from Russia and Poland, and the increase in the number of women and old men employed in field labour shows that the pick of the peasantry have been turning their thoughts elsewhere. And how greatly this want of farm labour is now felt, when the said pick of the labourers are driven into the battlefields of France, Belgium, and Austria! To induce men to remain in the country, land owners and even small farmers were only too ready to let small holdings at a moderate rent, but this inducement could not tempt them, when the British colonies, especially Queensland, held out to them the prospect of becoming owners of their own freehold on the richest lands of the State, by means of land orders granted to all immigrants. This prospect brought many hundreds of Germans to the State, who, as a rule, became well-to-do farmers.

Now, coming to live stock; sheep farming in most parts of Germany has declined, and cattle are kept chiefly with a view to milk and draught purposes.

In Westphalia, Mecklenberg, and Saxony, the sugar beet reigns supreme, but here again the dearth of skilled labour, which it requires, constitutes a serious difficulty, owing to the higher wages to be obtained in towns. Agricultural wages vary, of course, in different districts. The ordinary labourer earns 1s. 9d. a day in summer, 2s. a day at harvest time, and 1s. 6d. a day during the rest of the year, but he gets a cottage free, a small plot of ground for potatoes, vegetables, and flax, and is allowed the use of farm horses to work his allotment. Piece work, especially in Saxony, is paid much higher. Beer being one of the staple products of Bavaria, much attention is, of course, paid to the barley crop. It may be mentioned that Bavarian beer may only be brewed from malt

and hops, and this regulation is enforced by very heavy penalties. With regard to German agricultural implements, these are as good as in any countries advanced in agriculture, with the exception of mowing machines and binders, in which the United States are first, and of steam ploughs and threshing machines, in which England excels. It seems, on the whole, that if our farmers had the scientific knowledge of the German ones, they would be able to hold up against taxes, railway rates, open ports, and foreign competition. It is an incontestable fact that the chemical laboratories of the Agricultural Colleges have revolutionised agriculture. Nowadays, thanks to the Agricultural Chemist, we know the chemistry of the soil, the plants, the live stock, the manures, the foods. Thus, agriculture to-day is as much a science as in old times it was a matter of purely practical experience.

So we come to this, that the best foundation a State can give to its people is a thorough genuine and technical education, to fit them out adequately in order to be able to successfully fight their way. It affords them the best chances of being able to work against long odds, so that they may hold their own in bad times, and even through such a crisis as severe droughts such as that which terminated in 1902 in Queensland, and which is even now threatening this State with disaster. The German farmer has had to fight against agricultural depression, but, by means of his thorough education and resources, backed up by science and State help, he has withstood bad seasons and low prices; he has been going ahead all the time, learning how to increase his crops and increase his income per acre in the same proportion as prices receded. With this object in view, no stone was left unturned, and his resources were strained to the utmost. He found great help in co-operation—co-operation in credit, loans, purchase and sale of produce, purchase of foods, seeds, mineral manures, in drainage and irrigation works of large dimensions, and in dairying. In all his struggles, the State helped him by encouraging scientific research at its experiment stations, by gratis advice, and farmers recognised the value of unions and combined efforts to swim up-stream. He recognised that, single-handed, he was powerless to achieve anything, but, although not individually intrinsically wealthier when combined, he found himself, when united, and working hand in hand co-operatively, strong enough and able to withstand the worst of times.

In this State of Queensland, State aid has a bad name, and though all classes are ready enough to take it when they can get it, most of them denounce it when offered to any but themselves. The prejudice, however, has its good side, and if the land were treated fairly in other respects, we doubt if our Queensland farmers would either require or desire such fostering care as is bestowed on their calling elsewhere. If a great industry like agriculture cannot rest upon its own bottom, there must be something wrong in the conditions under which it is pursued. Nor are we at all satisfied that a case has been made out for German agriculture which political economy could approve. Still, it must be recognised that State aid in Queensland in certain directions has done very much of late years to assist the farmer, not only in improved

methods of agriculture, but in the establishment of an up-to-date Agricultural College, in the institution of an Agricultural Bank, in the introduction of instruction in agriculture in State schools, in the appointment of instructors in all branches of agriculture, including sugar experiment stations, stock-breeding, wheat-growing, in the establishment of State Farms, institutions for instruction in tropical agriculture, in dairying, stock-raising. Furthermore, every encouragement is given to farmers throughout the State to improve their methods of raising and marketing their products, by means of travelling exhibits, accompanied by competent instructors. The dairying industry is especially encouraged, and has usually been under the supervision of highly-qualified scientific experts. Tropical industries have also for many years enjoyed the fostering care of the Department of Agriculture, whilst horse-breeding is assisted by a constant inspection of stallions by Government veterinary surgeons, and chemical analysis of soils, water, fodders, &c., is at the service of farmers throughout the whole State. It might be said, indeed, that the system of Government assistance to the rural industries of Queensland in many respects is quite as up-to-date as that of any European country, although, owing to the sparse population of the State, there has been as yet no necessity for the vast expenditure incurred in the United States of America, and in some European countries, in the interests of the man on the land.

KILLING TIMBER BY RINGBARKING AND POISONING, AS PRACTISED IN NEW SOUTH WALES.

Mr. A. H. Farrand, Diddillibah, writes:—When ringbarking was in its comparative infancy in New South Wales, thirty to forty years ago, mostly only box timber was ringed, where it had become too dense to allow pasture to grow. Areas were large and rentals very cheap, so that reclaiming inferior country was unnecessary. The style of ringbarking was sapping, but after a time other methods were tried, such as chip ringing, frill ringing, removing strip of bark around tree, &c., but chip ringing remained in general use. It was thought that sapping, causing the tree to die quickly, conduced to a plentiful and vigorous growth of suckers, and there were no doubt good grounds for such opinion. By destroying the timber quickly one is able to bring the land into use so much more quickly that such very much more than compensates for the extra suckers that it may bring. Ringing being done in the summer, when sap is well up, its effect, when tree has been sapped, is shown in a few days by leaves turning colour; and slumming of work can easily be detected, but contractors for this style might not now be easily obtained.

For some years past in New South Wales there has been a great rush for land, and any small area now made available, within reach of a railway, that can be improved into farming land, commands numerous applicants. Such blocks in almost every case are heavily timbered, and the best and cheapest method of destroying such has become an important matter.

Various liquids for poisoning trees have been put on the market, and poisoning with arsenic has been extensively practised of late years. Arsenical poisoning, like sapping, produces a very quick effect, and when it was first tried in New South Wales the Press was deluged with letters extolling its merits. The experimenter was so elated with its apparent success that he made his deductions without waiting sufficiently long to be fully seized of all the points. Arsenic is applied in a liquid form by pouring it into ring cut around tree from a vessel such as a teapot, and frill-ringing, holding such liquid best, is generally adopted. The poison is at once carried up by rising sap and the top of the tree dies as in sapping, but as such poison does not go below the ringed cut, the bottom of the tree is not affected, and a good healthy crop of suckers soon arrives.

Arsenical poisoning of trees is about on a parallel with sapping. If four cuts are put in tree opposite one another and arsenic applied tree will die, and if just one cut is put the limbs on tree on that side die, whilst the rest of the tree flourishes, thus showing how arsenic is carried up. The other liquids put on the market had much the same effect as arsenic, and as none of them had any effect below cut into which they were poured, the bottom part of tree still went on producing suckers. After a very considerable experience in dealing with timber in New South Wales in various parts, and many years with the Government, where one of my duties was to inspect ringbarked areas, so that I saw the work being done and years afterwards saw the effect, I would summarise as follows:—Have work done, whether arsenic is used or not, late in the summer, so that the suckers will begin to sprout in the winter time, when the tree is in its most unhealthy period, as you will then have fewer suckers, and those that do grow will not be such strong growers. Also, if the country is stocked with sheep, they will, in the winter time, keep nibbling at green shoots and so impede their growth, and, in some instances, altogether kill them.

Poisoning with arsenic repays the trouble, but do not make your solution too weak, as the arsenic itself is cheap. The "rise and fall of sap," so generally spoken of, is apt to deceive you, but remember, when the arsenic is applied, the sap is rising, and poison therefore carried upwards, so be prepared to see the tree below the cut still growing. This applies to every poison I have seen used.

Fire sapping is being extensively used in the farming districts of New South Wales. A little earth is removed at the foot of the tree and it is lightly ringed at the bottom, and any small timber stacked around it and burned. This causes the tree to die quickly, and it will burn up when grubbed.

A RIVAL OF LUCERNE.

Mr. R. S. Nevill, formerly Tobacco Expert to the Department of Agriculture and Stock in Queensland, sends us the following notice, published in the "Kansas City Star" (U.S.A.), on sweet clover, as a substitute for lucerne for stock and as a soil improver. Mr. Nevill was for many years in Queensland, where he made many friends, who will be glad to hear that he is in the best of health, and comfortably settled at Carthage, Missouri:—

Sweet clover excels alfalfa as a cattle pasture and is superior to all other crops for improving soils deficient in organic matter, though it has been lately overrated as a crop to grow under all circumstances. These conclusions are reached as a result of investigations by the agronomy department of the Kansas State Agricultural College.

"In the last two years," says C. C. Cunningham, assistant in co-operative experiments, "there has taken place in the popular mind a radical change in opinion regarding sweet clover. Once considered a noxious weed, it is now recognised as a valuable crop. To a large extent sweet clover is deserving of this change of opinion regarding it, but, like any new crop that suddenly comes into favour, it has been overrated for growing under all conditions in Kansas. It has proved valuable, however, under certain conditions and for special purposes.

A SUBSTITUTE FOR ALFALFA.

"Sweet clover can be grown to advantage for hay in Eastern Kansas on some soils not adapted to alfalfa or red clover. It is, however, a substitute for these crops and is useful for hay when the more valuable kinds cannot successfully be grown.

"Sweet clover is of value as a pasture and soil improvement crop and will undoubtedly be extensively utilised for these purposes. Properly handled, sweet clover will furnish more pasture than most other pasture crops, especially on the poorer types of soils. It excels alfalfa as a pasture for cattle, in that it rarely causes bloat. Sweet clover is superior to all other crops for use in improving soils deficient in organic matter.

NOT FOR DRY LAND.

"During the last two years the agronomy department has co-operated with many farmers in Western Kansas in testing sweet clover on the uplands. The results obtained were not very successful. Evidently sweet clover has been overrated as a dry land crop. Under dry land conditions—that is, where alfalfa cannot be successfully grown on the uplands because of the limited amount of precipitation—sweet clover is subject to the same disadvantages. The same difficulties in obtaining a stand are met with, although sweet clover is more hardy and the chances

of failure are slightly less. Attempts to seed sweet clover under dry land conditions during the last two seasons have nearly all resulted in failure due to various causes.

DEFEATED BY THISTLES.

"In many tests the sweet clover seeded early in the spring failed to compete successfully with the ever present Russian thistle. In other tests the young plants perished in temporary periods of drought that prevailed before the sweet clover obtained a good roothold. Other stands were destroyed by beating rains before the plants made much growth. Grasshoppers relish young sweet clover plants and may, if they are numerous, destroy the crop. Where stands of sweet clover were obtained on uplands it failed to make profitable yields of hay the first season.

"Because of the high cost of the seed, the short life of the crop, the uncertainty of getting a stand, and the smaller yields of forage as compared with the sorghums, it is doubtful if sweet clover will prove a satisfactory crop on the uplands in Western Kansas."

[We do not think that Queensland farmers would care to utilise their best lucerne lands for the planting of sweet clover, which has long been looked upon as a weed, and which appears to have proved a failure for the reasons given in the above article.—Ed. Q.A.J.]

PRICES OF WHEAT AND THE EQUIVALENT PRICES OF MANUFACTURED PRODUCTS.

By the courtesy of the Government Statistician, Sydney, the Queensland Department of Agriculture and Stock has received the results of an investigation by Mr. J. B. Trivett, Government Statistician, New South Wales, into the cost of producing flour in Sydney, and also a copy on " The Prices of Wheat, and the Equivalent Prices of Manufactured Products " therefrom.

In view of considerable complexity surrounding this question, and the many confusing statements given by witnesses during the investigation of the price of flour, and of bran and pollard, by the Necessary Commodities Control Commission, Mr. Trivett deemed it necessary to make an examination into the whole matter of milling charges attaching to the production and distribution of flour and wheat products. For obvious reasons, details of the mills cannot be given, but the salient features of the figures supplied by millers respecting the manufacture and sale of flour in Sydney are given.

The returns now under discussion related to 5,296,457 bushels of wheat, which were bought and delivered at mills for £977,218, or at an

average price of 3s. 8·3d. per bushel, and from which 111,978 tons of flour were produced.

The following table gives the massed cost arising from the various operations during milling, and business charges attaching to the selling of the products of five city mills:—

—	Total Cost.	Cost per Ton of Flour Produced.
	£	£ s. d.
Gristing—		
Mill wages, bags, repairs, maintenance, fuel, and other materials	67,998	0 12 1·73
Other Charges of Production—		
Rent, stacking, rates, fire and accident assurance, interest, depreciation.. ..	34,161	0 6 1·22
Selling Charges—		
Discount and exchange, stamps, stationery, advertising, commission, law, salaries, travelling, bad debts, and other.. ..	42,404	0 7 6·89
Total cost of milling and selling ..	144,563	1 5 9·84

I have endeavoured to find out what proportion can be fairly allowed for waste in the gross bushels purchased by the miller, and to do this have accepted, under their own definition, the figures for cleaned and uncleaned wheat, which give me the following statement :—

Uncleaned Wheat.—39,312 tons of flour were obtained from 1,893,865 bushels of wheat, or an average of 48·175 bushels of wheat per ton of flour produced.

Cleaned Wheat.—72,666 tons of flour were obtained from 3,402,592 bushels of wheat, or an average of 46·825 bushels of wheat per ton of flour produced.

Hence we get the following consideration :—

Uncleaned wheat	48,175 bushels per ton
Cleaned ,, ...	46,825 ,, ,,
Waste	1,350 bushels per ton

This waste is equivalent to 2·8 per cent.

Using the above figures, and assuming the average weight for uncleaned wheat at 60 lb. per bushel, we have the following results :—

		lb.
48,175 bushels, at 60 lb. per bushel ..	=	2,890·5
Waste at 2·8 per cent.	=	80·9
Net weight of products	=	2,809·6
Of which flour is	..	2,000
Offal (bran and pollard), &c.	=	809·6

Whence I assume that with every ton of flour produced there is available as offal 810 lb., and the rest, viz., 81 lb., must be written off as waste which may or may not provide some small monetary advantage.

Having thus cleared the groundwork, I have calculated tables which should prove useful, showing the prices per ton at which flour can be manufactured, assuming stated prices of wheat per bushel, and of offal (bran and pollard) per ton. This gives the actual cost of the flour without any allowance for delivery charges and profit. The tables are attached.

PRICE AT MILL, SYDNEY, AT WHICH FLOUR CAN BE MANUFACTURED WITH WHEAT AND OFFAL AT STATED PRICES.

This does not allow for Profit, but is the actual Cost.

Assumed 48.175 Bushels of Wheat = 1 ton (2,000 lb.) of Flour and 810 lb. (effective) Offal.

Price of Wheat per Bushel.	Offal at £4 10s. per Ton.	Offal at £5 per Ton.	Offal at £5 10s. per Ton.	Offal at £6 per Ton.	Offal at £6 10s. per Ton.	Offal at £7 per Ton.	Offal at £7 10s. per Ton.	Offal at £8 per Ton.	Offal at £8 10s. per Ton.
s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
3 6	7 18 0	7 13 11	7 9 10	7 5 10	7 1 9	..	..	..	..
3 7	8 2 1	7 18 0	7 13 11	7 9 11	7 5 10	7 1 10	..	..	..
3 8	8 6 1	8 2 0	7 17 11	7 13 11	7 9 10	7 5 10	..	..	..
3 9	8 10 1	8 6 0	8 1 11	7 17 11	7 13 10	7 9 10	..	..	..
3 10	8 14 1	8 10 0	8 5 11	8 1 11	7 17 10	7 13 10	..	..	..
3 11	8 18 1	8 14 0	8 9 11	8 5 11	8 1 10	7 17 10	7 13 9	..	..
4 0	9 2 1	8 18 0	8 13 11	8 9 11	8 5 10	8 1 10	7 17 9	..	..
4 1	9 6 2	9 2 1	8 18 0	8 14 0	8 9 11	8 5 11	8 1 10	..	..
4 2	9 10 2	9 6 1	9 2 0	8 18 0	8 13 11	8 9 11	8 5 10	8 1 9	..
4 3	9 14 2	9 10 1	9 6 0	9 2 0	8 17 11	8 13 11	8 9 10	8 5 9	..
4 4	9 18 2	9 14 1	9 10 0	9 6 0	9 1 11	8 17 11	8 13 10	8 9 9	..
4 5	10 2 2	9 18 1	9 14 0	9 10 0	9 5 11	9 1 11	8 17 10	8 13 9	..
4 6	10 6 2	10 2 1	9 18 0	9 14 0	9 9 11	9 5 11	9 1 10	8 17 9	8 13 9
4 7	10 10 3	10 6 2	10 2 1	9 18 1	9 14 0	9 10 0	9 5 11	9 1 10	8 17 10
4 8	10 14 3	10 10 2	10 6 1	10 2 1	9 18 0	9 14 0	9 9 11	9 5 10	9 1 10
4 9	10 18 3	10 14 2	10 10 1	10 6 1	10 2 0	9 18 0	9 13 11	9 9 10	9 5 10
4 10	11 2 3	10 18 2	10 14 1	10 10 1	10 6 0	10 2 0	9 17 11	9 13 10	9 9 10
4 11	11 6 3	11 2 2	10 18 1	10 14 1	10 10 0	10 6 0	10 1 11	9 17 10	9 13 10
5 0	11 10 3	11 6 2	11 2 1	10 18 1	10 14 0	10 10 0	10 5 11	10 1 10	9 17 10
5 1	11 14 4	11 10 3	11 6 2	11 2 2	10 18 1	10 14 1	10 10 0	10 5 11	10 1 11
5 2	11 18 4	11 14 3	11 10 2	11 6 2	11 2 1	10 18 1	10 14 0	10 9 11	10 5 11
5 3	12 2 4	11 18 3	11 14 2	11 10 2	11 6 1	11 2 1	10 18 0	10 13 11	10 9 11
5 4	12 6 4	12 2 3	11 18 2	11 14 2	11 10 1	11 6 1	11 2 0	10 17 11	10 13 11
5 5	12 10 4	12 6 3	12 2 2	11 18 2	11 14 1	11 10 1	11 6 0	11 1 11	10 17 11

5 6	12 14 5	12 10 4	12 6 3	12 2 3	11 18 2	11 14 2	11 10 1	11 6 0	11 2 0
5 7	12 18 5	12 14 4	12 10 3	12 6 3	12 2 2	11 18 2	11 14 1	11 10 0	11 6 0
5 8	13 2 5	12 18 4	12 14 3	12 10 3	12 6 2	12 2 2	11 18 1	11 14 0	11 10 0
5 9	13 6 5	13 2 4	12 18 3	12 14 3	12 10 2	12 6 2	12 2 1	11 18 0	11 14 0
5 10	13 10 5	13 6 4	13 2 3	12 18 3	12 14 2	12 10 2	12 6 1	12 2 0	11 18 0
5 11	13 14 5	13 10 4	13 6 3	13 2 3	12 18 2	12 14 2	12 10 1	12 6 0	12 2 0
6 0	13 18 6	13 14 5	13 10 4	13 6 4	13 2 3	12 18 3	12 14 2	12 10 1	12 6 1
6 1	14 2 6	13 18 5	13 14 4	13 10 4	13 6 3	13 2 3	12 18 2	12 14 1	12 10 1
6 2	14 6 6	14 2 5	13 18 4	13 14 4	13 10 3	13 6 3	13 2 2	12 18 1	12 14 1
6 3	14 10 6	14 6 5	14 2 4	13 18 4	13 14 3	13 10 3	13 6 2	13 2 1	12 18 1
6 4	14 14 6	14 10 5	14 6 4	14 2 4	13 18 3	13 14 3	13 10 2	13 6 1	13 2 1
6 5	14 18 6	14 14 5	14 10 4	14 6 4	14 2 3	13 18 3	13 14 2	13 10 1	13 6 1
6 6	15 2 7	14 18 6	14 14 5	14 10 5	14 6 4	14 2 4	13 18 3	13 14 2	13 10 2
6 7	15 6 7	15 2 6	14 18 5	14 14 5	14 10 4	14 6 4	14 2 3	13 18 2	13 14 2
6 8	15 10 7	15 6 6	15 2 5	14 18 5	14 14 4	14 10 4	14 6 3	14 2 2	13 18 2
6 9	15 14 7	15 10 6	15 6 5	15 2 5	14 18 4	14 14 4	14 10 3	14 6 2	14 2 2
6 10	15 18 7	15 14 6	15 10 5	15 6 5	15 2 4	14 18 4	14 14 3	14 10 2	14 6 2
6 11	16 2 8	15 18 7	15 14 6	15 10 6	15 6 5	15 2 5	14 18 4	14 14 3	14 10 3
7 0	16 6 8	16 2 7	15 18 6	15 14 6	15 10 5	15 6 5	15 2 4	14 18 3	14 14 3

JOHNSON GRASS AND SORGHUMS.

Johnson grass, like other plants of the sorghum family, will supply bulky succulent feed for dairy cows. Ordinarily, sorghum is, by analysis, low in proteids (flesh formers), and relatively high in carbohydrates (sugars, starch, gums, &c.).

Johnson grass is not rich enough to support dairy cows satisfactorily, and other concentrated foods or lucerne must be added to increase its food-value. Practically all sorghums contain, at certain stages of their growth, a poisonous principle, hydrocyanic acid; plants of this description, particularly when immature (before the seed heads have formed), should be allowed to wilt in the sun before use, to allow any poisonous substances to pass off in a volatile condition. Johnson grass is not recommended for fattening cattle and sheep. It makes a coarse, pithy chaff. Coarseness reduces its value as a hay plant. Good lucerne must be blended with it to increase the palatability of the mixture. Under normal conditions the grass will start growth in the spring and early summer months.

Summary.—Johnson grass is likely to prove a serious pest to cultivated land and is not recommended.

MARKET GARDENING.

SHORT NOTE ON SEED TESTING.

By J. F. BAILEY, Director of the Brisbane Botanic Gardens.

In a climate like that of Queensland, where rains are experienced during the summer months, it has been found that seeds do not keep so well as they do in places where the reverse is the rule; therefore, when it is stated in works on the subject that certain seeds keep good for a considerable length of time, we must dismiss such from our minds if we desire any measure of success. For instance, here are a few of the cases quoted, as the result of experiments carried out in Great Britain:—Beans, 4 to 5 years; turnip, 3 to 4 years; cabbage, 3 to 4 years; carrot, 3 years. Probably for the reasons given above, the percentage of germination allowed in the Queensland Act has been fixed at a somewhat lower scale than that allowed in other countries.

In testing samples of seeds several important factors must be considered, chief among which are—power and energy of germination, quality, purity, and absence of insect and fungus pests. Energy of germination is an item of great importance. The grower desires an even crop, and this can only be obtained by putting in seed of an even nature, not, as is sometimes done, mixing old seed with new, however good the former may look. In the matter of purity, consideration must be given to the amount of foreign substances included, such as dirt, and, worst of all, seeds of weeds of an injurious character. Every care should therefore be taken by the growers to see that the sample they are about to sow conforms to the foregoing conditions. Most of our leading seedsmen, we are given to understand, are careful to see that the article they

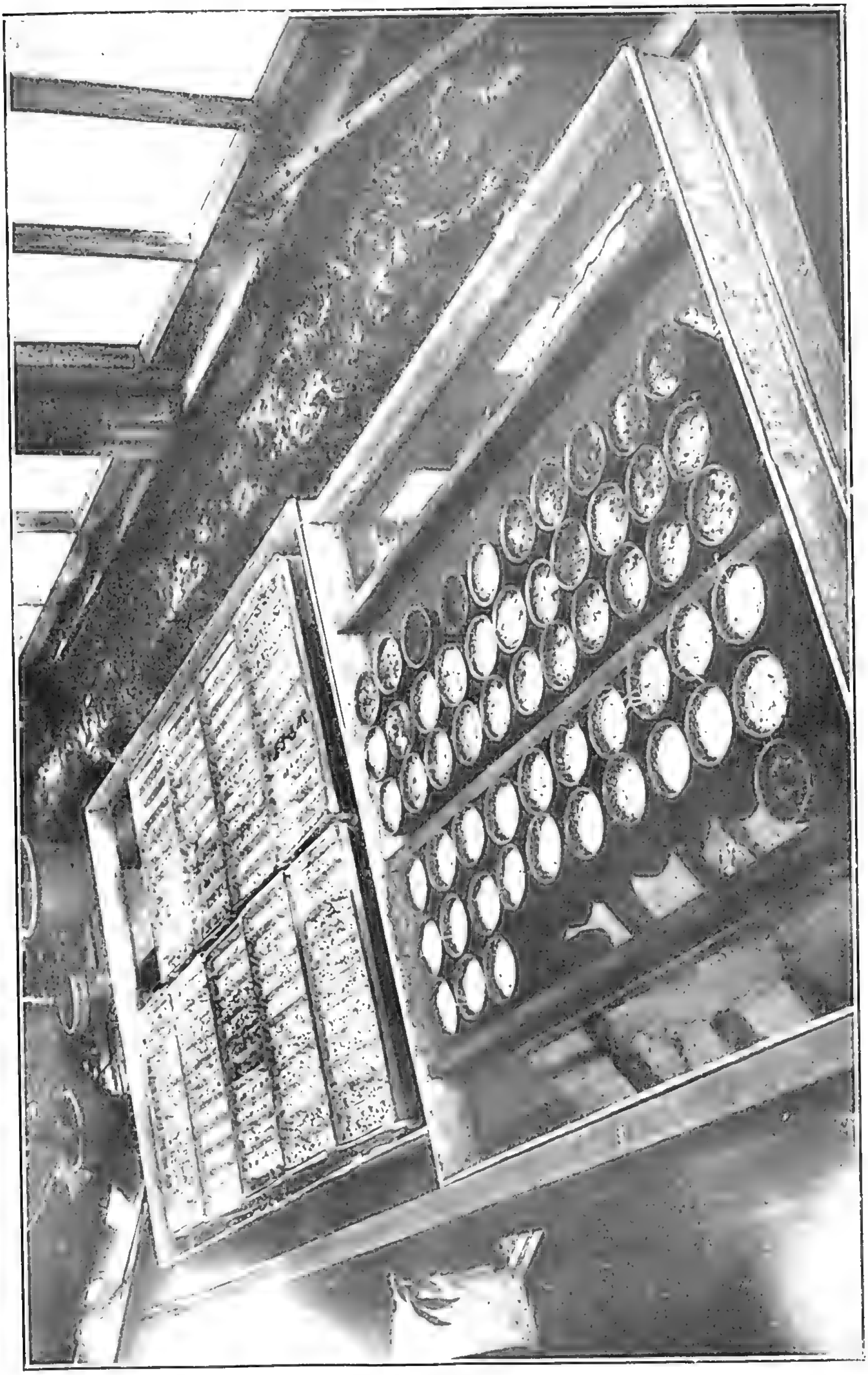


PLATE 15.—SEED TESTING AT THE BOTANIC GARDENS.

sell conforms to the conditions of the Pure Seeds Act, but where any doubt exists in the mind of the grower he should carefully test his seeds before sowing them. From a purity point of view this is, in most instances, simple enough, but in the case of some grasses it becomes a more difficult matter.

Germinating tests are carried out by several very simple methods. It is our usual practice to adopt two methods, so that one may act as a check to the other, and so far we have found it answer well. One is by sowing in earth which has been sterilised by roasting or steaming, and the other by placing the seeds on two thicknesses of thick flannelette placed in the bottom of shallow galvanised trays. These trays are placed on blocks of wood standing in deeper trays in which water is held, and if the flannelette is allowed to go over the ends and into the water, a siphon will be formed which will ensure a continual and even supply of moisture to the material. Plates might be used instead of the trays with equal chance of success.

When planting the seed in earth a general rule to go by is to sow it not more than its own depth of soil, or in the case of grasses, silver sand. The material must be kept continually moist. The trays or pots should be covered with glass, which if darkened greatly assists in the work of germination and is a protection against vermin. Before using, and after each test has been completed, the flannelette should be boiled to ensure its being free from fungus growths.

Poor germinating power may be attributed to several causes. For instance, the seeds may not have been allowed to ripen before being gathered, or too long a time may have elapsed between the time of gathering and sowing, or they may have been exposed in the shops for a considerable length of time, or may have been attacked by insect or fungus pests. Legumes, such as peas, beans, &c., and cereals like maize, wheat, &c., are usually preyed upon by insects in an alarming degree.

[An excellent article on testing seeds, by G. B. Brooks, Instructor in Agriculture, will be found in the May issue of the Journal, 1912.—Ed. Q.A.J.]

CHICORY.

In the April issue of the Journal we drew attention to the value of chicory, and we showed that the cultivation of the chicory plant is not more troublesome than the growing of carrots, parsnips, or beets. We have since then made inquiries from firms in Brisbane, who are purchasers of this crop, sliced and dried. Before the war the price of the dried root was about £16 per ton. To-day it runs, according to quality, from £24 to £32 per ton. The chief advantages of chicory as a farm crop are, its adaptability to dry, poor soils, its power of growing several large cuts of green food per annum when once established, and its perennial character and easy cultivation. It is hardy, and provides food for stock when other green crops are scarce. A crop of leaves can be cut in the autumn, and afterwards three or four crops per annum will be provided. The plant will last in a productive state for four or five years. From 8 to 10 tons of fresh roots are obtained per acre.

Dairying.

THE QUEENSLAND MILKING-MACHINE.

Messrs. Preston and Co., agents for the above machine, are, we understand, receiving satisfactory reports from all districts where the "Shepperson" milking-machine is in use; and it is gratifying to find that the *first* and *only* Queensland patent milker is more than holding its own against the competition of the imported machine, upwards of 10,000 cows being milked each day by this means.

The reason of the marked and immediate success of the "Shepperson" machine is not far to seek; the new patents, as well as improvements, enabled a dairyman with a single "Shepperson" bucket to milk twice as many cows as could be done by the old style of milking-machine, and three times as fast as by hand, the milking being better done, and each cow properly stripped.

All rubber parts can be boiled, thus ensuring absolute cleanliness.

Both the bucket and releaser machines are manufactured of the very best material; and each part—no matter how small—is made by skilled workmen, not boys; so that the machine can be guaranteed in every respect.

Messrs. W. A. Preston and Co., dairy machinery merchants, Brisbane, are the Australasian agents for this machine, and would, we feel sure, be only too pleased to show intending purchasers the machine under construction, or a plant erected and at work on a dairy farm close to Brisbane, or possibly in their own neighbourhood.

THE UDDER OF THE COW AND MILKING MACHINES.

The udder of the cow consists of four quarters and four teats, of which a fore and hind quarter constitute a lateral half. The fore and hind quarters of each side, although functionally distinct, have no fibrous division between them. The udder is held in position by broad suspensory bands which attach it to the abdominal tunic, and secondly by the skin which covers it.

The milk vein from each half of the udder unites with its fellow of the opposite side in front of that organ, and immediately afterwards divides to form the two milk veins which pass along the under surface

of the abdomen. The veins of the udder are exceedingly numerous, and so are the lymphatic glands.

The gland tissue is made up of a number of minute vesicles surrounded by a network of minute bloodvessels. The milk is formed in these vesicles and conveyed to a cavity at the base of the teat. These cavities are very small in dry cows, but during lactation they are much increased in size. They hold the milk which is slowly formed during the milking. The teats have thick walls and a single orifice or opening. The walls are composed of skin and a mixture of elastic and unstriped muscular tissue. At the base of each teat the muscle fibres are very few indeed, but increase towards the free extremity, where they form into a band which by keeping the orifice closed prevents the milk from escaping. The inside of the teat is lined by a delicate mucous membrane.

From the above description it will be readily seen that any foreign body introduced into the udder will set up serious complications. In milking, the human hand is the oldest method, but in large herds it is often found to be impossible to get through all the animals unless at great cost—labour. As a result the milking machine has been introduced. Many of these instruments are of great value, as they are worked by suction, thus acting in the same manner as the human hand. A great mistake is made by some people, who think by introducing a foreign body into the teat they will carry off the milk easier and and at less cost. Now, take the construction of the teat as mentioned above, and it will be seen that the teat is lined with a delicate mucous membrane, and unless one understands this thoroughly, there is a grave danger in injuring the membrane and setting up stricture or obliterating the teat altogether.

Another danger one has not to forget in introducing a foreign body into the udder, is the introduction of various germs which set up serious complications. The cow owner would be well advised before inserting any instrument into the udder to take into consideration the anatomy of the gland and teat and also its accompanying dangers.

SPLIT PEAS.

Special varieties of field peas are grown for split peas, viz.:—Prize-taker, Woodford, Partridge, and Dun. It is somewhat surprising that the cultivation of this crop has not received attention by our farmers, considering the quantities which are imported into Australia every year. There is this much to be said of the crop: That it requires very little labour to prepare the product for the market—merely harvesting, threshing, and winnowing. For split peas, choose those which produce small pods and seeds, divide easily into halves, and of which the skin of the pea is loose. It will be found that, in threshing such kinds, the seeds split in halves, and that, in winnowing, the skins are blown off, leaving the article ready for market.

The Horse.

THE CLYDESDALE HORSE.

By P. R. GORDON.

The Clydesdale has unquestionably established itself as the heavy draught horse, *par excellence,* of Queensland. There have been occasional introductions of the heavy English Shire horse, but that breed has never made headway here. It is not contended by modern breeders that the breed is indigenous to Scotland. It is freely acknowledged that it has been evolved from the blood of the Flemish horse engrafted on a native Scottish breed, by skilful breeding. The writer has been fortunate enough to obtain from a gentleman, who made his mark as a Clydesdale breeder in Scotland, some interesting notes on the origin of the breed, and the extent to which additional weight has been imparted to the modern type by judicious selection of English mares, the characteristics of the type, however, having been carefully preservd. Regarding the origin of the Clydesdale, there is a certain amount of doubt concerning the tap root from which the breed originally sprang. Three hundred years of time have left the most enlightened in doubt on certain points, which, however, are now narrowed down to insignificance. That it is a composite breed is not now in dispute, and the only serious argument to the contrary ended when the final evolution started about the beginning of last century. Whether at that time they were the ancient horses of Caledonia graded up with, or without, the assistance of Flemish blood was a matter that was seriously in dispute some hundred years ago. At the present time, however, the only or at least the most important point in dispute is the exact date of the introduction of Flemish blood. One matter is clear. At one time there was a distinct species of horse in Britain—a survival of the fittest. There certainly is no time hinted at when there were no horses in Britain. Another matter that is equally certain is that climate and environment have moulded that common ancestry into variations consistent with the surroundings, and formed a base upon which external influences have gradually evolved a now celebrated breed of horses, famous for general utility from the rising to the setting sun. Given a groundwork of a native race of horses in separate localities, all clearly defined and characteristic of their surroundings, the question that first presents itself is, why should they be called Clydesdales? There can be little doubt that there was a trade of considerable dimensions in horses with the continent in the early Stuart reigns, and that this trade was prosecuted with success by the Douglasses, the ancestors of the ducal line of Hamilton, whose headquarters were in the valley of the Clyde, and the introduction of this foreign influence, together with the conditions of agriculture in Lanarkshire—the valley or dale of the Clyde—at a much earlier date than any other part of Scotland resulted in the first efforts to improve the breed to a standard

sufficient to insure recognition from other parts of Scotland; notably Aberdeenshire and Galloway, both of which districts accepted the superiority of the Lanarkshire or Clydesdale horses, and profited thereby. There is still a strong belief that in the seventeenth century the Duke of Hamilton imported six black stallions from Flanders, and that they were located at Strathaven Castle. This matter gave rise to much discussion in agricultural circles about a hundred years ago, when no trace of their probable existence could be emphatically established by those engaged in the controversy. Strange to say, there was not the slightest shadow of doubt expressed as to the magnitude of the importations into England of the Flemish stallions. Nor was any consideration given to the depredatory raids into England by the adjacent border clans, to whom horses were a valuable commodity, and it is no disgrace to say the Scotchmen held their own in their forays, and no doubt brought many a good English horse to their country. But, in spite of all, a large number of Scotchmen could not be persuaded that there was Flemish or even English blood in their Lanarkshire horses. But a few more years settled matters beyond dispute, and about 1715 the Duke of Hamilton, associated with John Paterson, of Lochlyoch, brought over Flemish stallions from England, and these horses, whatever may have been done before then, exerted such an influence on the native mares that they, practically, brought Clydesdale history down to the early part of the nineteenth century, and handed over a distinct breed of horses ready to be moulded to the ever-changing demands of a progressive country. It will be well to consider the groundwork upon which these Flemish stallions were to exercise their influence, and at an early date two districts stand out prominently where the improvement of draught horses began at a very early age—Galloway and Aberdeenshire. In both these districts the climate and soil favoured horsebreeding, and, given the advantage, even at the present day, of a Galloway or Aberdeenshire up-bringing, the Clydesdale starts in life with a considerable advantage over those of other districts. A new era awoke in the nineteenth century. The Clydesdale now established proved himself the *beau ideal* of a farm horse, but with the advent of the city trade, and more especially of the coal and iron portion of it, a demand sprang up for a heavier horse with the same activity—a horse that could shift his two-ton load with reasonable expediency. Reference has already been made to the importation of Flemish stallions into England, just as they were into Scotland, and that their influence was on one and the same breed. But it is well known the external influences alone will not produce similar effect; environment plays its part, and it did so with a thoroughness just as pronounced as it had done in the resulting difference between the highland garron and a seventeenth century Aberdeenshire draught—till then both of the same strain. The result was that in England there was to be found a class of horses two to three hundredweight heavier than the Clydesdale, and yet of the same breed. With a draught horse of ideal weight, the next step was to see how his other qualifications fitted with the requirements of a dray horse for city use. The Clydesdale was, except his deficiency in weight, the ideal in every other respect.

Scottish breeders always made for good feet, correct pasterns, flinty limbs, and oblique shoulders in their principal objective. They had been breeding and cultivating such for years and had generous assistance from local influences of soil and climate. But in England the demand was for size, and the fens of Lincolnshire lent themselves admirably to that purpose, while neither man nor nature troubled much about the quality of the limbs or the slope of the shoulder. They got the size. It was then that the science of breeding began to tell, and the theory spread that, everything equal in health and vigour, breeding could be controlled to some extent, and desired objects accomplished. The idea that the sire influenced the locomotive and the dam the internal organs of the progeny began to find favour among the more enlightened class of the agricultural community. A very strong proof of this can be seen in the

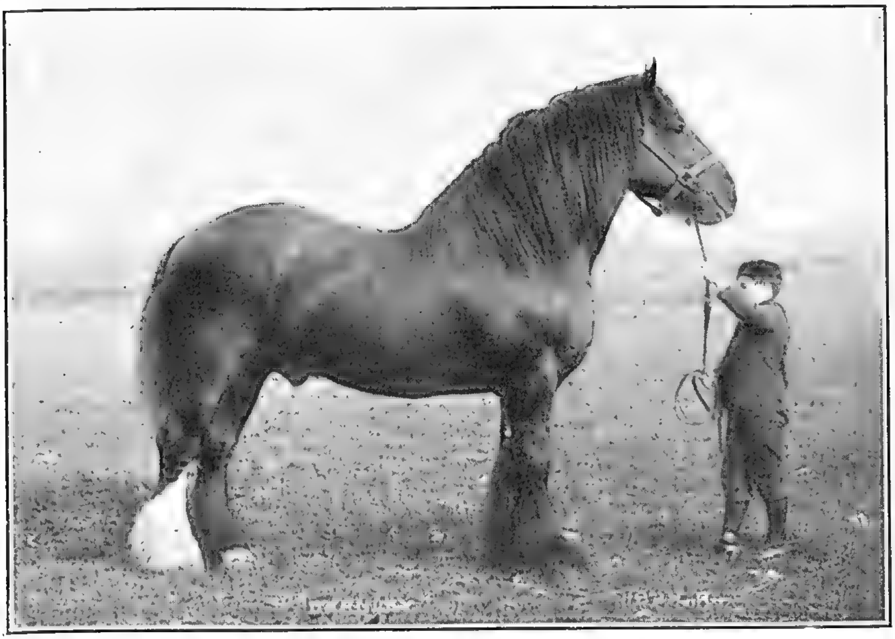


PLATE 16.—DARNLEY, THE GREATEST CLYDESDALE OF LAST CENTURY, AND A CHAMPION OF FORTY YEARS AGO.

breeding of the mule—the progeny of a donkey and a mare. The resulting mating gives the donkey's legs, tail, mane, ears, braying voice, the bodily structure and respiratory organs of the mare. The reverse form of breeding—the stallion on the she-ass—produces an animal with the horse's legs, tail, mane, neighing voice, and the body and respiratory organs of the she-ass. Whatever doubt there may be about the above theory, history itself is ample manifestation of its success in the breeding of the Clydesdale, and it is not wise to ignore all modern history, for several prominent examples have been apparent of what can be done by judicious care and judgment in draught horsebreeding as well as in other things. And the lesson was not thrown away on the Clydesdale breeders, for Shire mares, by the hundred, were rushed into Scotland to be mated with the Clydesdale stallions for the production of a draught

horse with plenty of size and substance, possessing good legs, feet. pasterns, and the slope of the shoulder that so readily indicates freedom and boldness of action. It was a success—so successful indeed that the demand could not be supplied, and Shire stallions were taken to Aberdeen to cross on the Clydesdales with the sole object of founding a base of brood mares—at the expense of a few faulty geldings, inheriting their sires' locomotive organs—on which the Clydesdale stallions afterwards wrought up to the high state of perfection that they are to be found to-day. So successful was the blending the Clydesdale and Shire for ordinary working purposes, that a few of the Lanarkshire breeders initiated it for stud purposes, and quite a number of Shire mares were introduced to Scotland. The result was just as pronounced as in the former case and, practically, left the landmarks of Clydesdale history.

PLATE 17.—PRINCE OF WALES, A CHAMPION OF A LATER PERIOD.

Darnley, the greatest Clydesdale of the past century, both as a show horse and a breeder, had Southern blood in his veins. Both grand-dams of Prince of Wales were Shire mares. Lork Erskine was, at least, a quarter full of Southern influence and Lord Lyon was half Shire—a first cross. In fact, there is not a registered Clydesdale in Scotland to-day that does not trace to Shire blood in a greater or less degree, while some of the leading successes are saturated with it. The history of the Clydesdale has, therefore, well-defined epochs—a foundation on the stock of ancient Caledonia or Britain; an amelioration to climatic conditions, and a survival of the fittest; the introduction of the Flemish blood at whatever age may be expected; the benefits secured through improved agriculture and better feed; the introduction of a heavier species of close affinities in English blood; and the glorious triumph of

consummated excellence in a draught horse that is, practically, the history of Scotland. The photos accompanying this paper are very interesting as showing the evolving results in Clydesdale breeding during the last half-century. Darnley, as above stated, was the greatest show and breeding horse of last century, and all Clydesdales of the present day—Baron's Pride, Bawn of Bucklyvie among others—are in-bred to him—some severely, others, it is thought, out of reason. Prince of Wales represents a horse bred towards an end, and Marcellus—full of Darnley blood—represents that " end"—the finished article, so to speak.

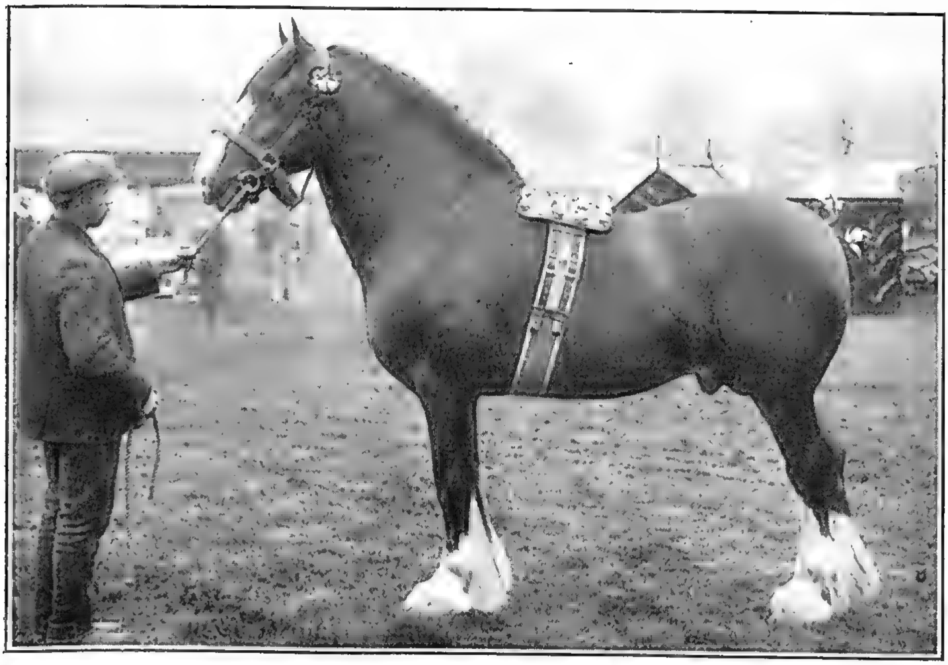


Plate 18.—Marcellus, a Champion of To-day.

CURE FOR MANGE IN HORSES.

Re a cure for mange in horses, we have at different times given recipes for a cure in this Journal. Amongst these, stabling and grooming are stated to be the best cure. Where this is not possible, oleaginous substances are the most effective applications. Many horses have been cured by daily washings with soft soap. In 1898, Colonel Moore, P.M. at Brisbane (then P.M. at Warwick), applied the following remedy to a horse of his own with complete success:—

Boiled linseed oil 1 pint, sulphur 1 lb., spirit of tar 2 oz. First mix the oil and sulphur, then add the spirit of tar and mix well. Apply with a hard brush or with the hand. Also a teaspoonful of carbolic acid to a pint of lard, stirred in and well mixed. This latter recipe is approved by our veterinary officers.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MARCH, 1915.

Three thousand nine hundred and sixty-five eggs were laid during the month, making a total for the whole twelve months of 54,202, an average of 1,355 per pen for the forty pens. Coomber's White Leghorns win the first prize with 1,545 eggs, beating Moritz Bros. by one egg. The Loloma Poultry Farm takes third place, being eleven eggs behind the winning pen—a really good finish. T. Fanning's Black Orpingtons win the monthly prize with 141 eggs. A full report of the whole competition will be issued later. The following are the individual records:—

Competitors.	Breed.	Mar.	Total.
A. T. Coomber	White Leghorns	95	1,545
Moritz Bros., S.A.	Do.	110	1,544
Loloma Poultry Farm, N.S.W.	Do.	117	1,534
T. Fanning	Do.	97	1,488
Geo. Tomlinson	Do.	110	1,478
Marville Poultry Farm, Victoria	Do.	131	1,456
R. Burns	Black Orpingtons (No. 1)	129	1,449
A. H. Padman, S.A.	White Leghorns	127	1,447
Mrs. Munro	Do.	129	1,443
T. Fanning	Black Orpingtons	141	1,441
Cowan Bros., N.S.W.	White Leghorns	110	1,440
E. Le Breton	Do.	131	1,426
A. F. Camkin, N.S.W.	Do.	103	1,422
E. V. Bennett, S.A.	Do.	127	1,416
Derrylin Poultry Farm	Do.	129	1,416
F. McCauley	Do.	112	1,380
R. Burns	S. L. Wyandottes	118	1,379
Loloma Poultry Farm, N.S.W.	Rhode Island Reds	71	1,373
R. Burns	Black Orpingtons (No. 2)	108	1,372
J. T. Coates	White Leghorns	98	1,358
Mrs. Beiber	Brown Leghorns	84	1,352
J. R. Wilson	White Leghorns	116	1,350
J. Franklin	Do.	105	1,348
J. Zahl	Do.	125	1,344
Kelvin Poultry Farm	Do.	44	1,334
J. M. Manson	Do. (No. 1)	103	1,326
J. T. Coates	Black Orpingtons	94	1,319
Range Poultry Farm	White Leghorns	119	1,317
G. E. Austin	Do.	95	1,314
J. Kilroe	Do. (No. 2)	88	1,298
D. Moreton, N.S.W.	Do.	91	1,262
J. D. Nicholson, N.S.W.	Do.	83	1,240
J. N. Waugh, N.S.W.	Do.	94	1,240
Mrs. Bradburne, N.S.W.	Do.	82	1,227
J. Gosley	Do.	46	1,215
R. Jobling, N.S.W.	Do.	36	1,205
J. Murchie	Brown Leghorns	72	1,196
J. Kilroe	White Leghorns (No. 1)	80	1,194
J. M. Manson	Do. (No. 2)	71	1,165
C. M. Jones	Do.	44	1,149
Totals	...	3,965	54,202

State Farms.

WINTER CEREALS, 1914.

BY R. E. SOUTTER, Manager, Bungeworgorai State Farm.

The preparation of the seed bed for this season's crop was concluded under difficulties. In the early part of the season the extreme dryness of the soil precluded satisfactory work being accomplished, whilst during the latter portion wet delayed operations considerably. Good germinating rains were experienced in May, followed by good soaking rains in June and July, accompanied by mild weather, resulting in crops making heavy growth. Unfortunately, these conditions were followed by a spell of dry weather during August and September, which reduced the ultimate yields somewhat, and resulted in the season being very early. Ideal weather for harvesting prevailed.

The following is a record of the precipitation for the twelve months ending 30th November, 1914:—

Month.	Wet Days.	Total Precipitation.	As per Fall.
December	11	1·67	·151 +
January	6	·82	·136 +
February	13	5·92	·455 +
March	10	3·98	·398
April	5	1·74	·348
May	8	1·43	·18 —
June	8	2·38	·297 +
July	7	1·18	·17 —
August	..	..	..
September	5	·58	·116
October	5	1·36	·272
November	6	1·23	·205
Total	84	22·29	

MANURIAL EXPERIMENTS.

The season 1914 was such that the nitrogenous manures, or the combinations containing such, gave the best results, whilst the benefits accruing from the use of phosphatic manures alone was infinitesimal, and were the same returns and differences obtained every season the use of artificial fertilisers would not be advocated. Such results only demonstrate how necessary it is to thoroughly test over a number of seasons everything supposed to influence the ultimate yields of different farm crops. Had any private individual manured his crop for the first time this year and obtained similar results, it would not be wondered at if he did not apply fertiliser next season. No doubt many in the past have entered into something similar and have had the anticipated results nullified in the same way, with the result they went back to the old methods, and in most instances still practise them. The preparation of the land whereon the following tests were made was as follows:—

Ploughed, January, last week, 5 in. to 6 in. Disc harrowed, April, first week, harrowed. Cultivated (one way), May, first week, 4 in., harrowed. Seed sown, 11th May. Variety, Bunge No. 1, treated 2 per cent. solution bluestone and dipped in lime water as a prevention against smut. Rate seeding, 37 lb. per acre. Germinated, peeping 17th. Harvested, 19th and 20th October. Crop harrowed once, 26th May.

Manure.	Cost.	Yield per Acre, 1914.	Yield Average, 5 Years.	Remarks.
		Bushels.	Bushels.	
1. Shirley's No. 1 Cereal Manure— 1 cwt. per acre	0 11 0	20·5	22·1†	Earing, 24th August, evenly; crop nice, even; foliage light in colour; little rust lower flag; height, 3 ft.; straw fairly fine; crop thin; head good, fairly well filled; grain good.
2. Shirley's No. 1 Cereal Manure— 1 cwt. per acre ½ cwt. Nitrate of Lime	0 17 9	23·5	24·0†	Earing, 24th August, evenly; crop even; colour foliage much darker in colour than No. 1; rust lower flag; straw fairly fine, slightly taller than No. 1; heads good, fairly well filled; grain good.
3. Shirley's No. 1 Cereal Manure— ½ cwt. per acre ½ cwt. Nitrate of Lime	0 12 3	24·20	24·7†	Earing unevenly, 24th August; colour foliage good in appearance; heavier crop, slightly uneven; little more rust than 1 and 2 on lower flag; height, 3 ft.; head good, fairly well filled; grain good.
4. Control (unmanured)	..	21·6	19·8†	Earing unevenly, 24th August; crop uneven; colour lighter than 2 and 3; crop uneven, thin; straw fine, little flag; very little rust; height, 2 ft. 6 in. to 3 ft.; heads good, fairly well filled; grain good.
5. 1 cwt. Superphosphate	0 7 0	22·4	22·9†	Earing evenly, 24th August; crop even, thin, straw fine; colour similar to 4; little flag; very little rust; height, 3 ft.; heads good, fairly well filled; grain good.
6. Thomas's Phosphate	0 5 6	22·6	20·8	Earing evenly, 24th August; crop fairly even, thin; straw fine; colour similar to 5; little flag; very little rust; height, 3 ft. 6 in.; head good, fairly well filled; grain good.
7. Stable manure, 15 tons Superphosphate, ½ cwt.	2 8 6	26·6†	22·3	Germination 1 to 2 days earlier than other blocks; earing unevenly, 26th to 29th August; crop very thick, very flaggy, straw coarse; crop uneven, height from 2 ft. 6 in. to 3 ft. 6 in.; felt dry spell very much; a goodly portion of the crop was tips withered and ears failed to just more than clear shot

				blade; heads poorly filled and grain pinched; had a good fall of rain been experienced in the latter part of August, it is considered this plot would have produced at the rate of between 35 and 40 bushels per acre. The application of this manure has so improved the mechanical condition of the soil here as to render it workable when the implements in use will hardly scratch that adjacent. It is intended to omit the application during 1915.
8. Superphosphate, 1 cwt. .. .. Nitrate of Lime, ½ cwt.	0 13 9	24·12	21·0†	Earing unevenly, 26th August; crop uneven owing to great inequalities in soil which peculiarities of seasons made more pronounced; height, 2 ft. 6 in. to 3 ft.; fairly flaggy in places; rust on lower flag; head fairly well filled; grain fairly good.
9. Nitrate of Lime, ½ cwt. .. .. Superphosphate, 1 cwt. .. .. Sulphate of Potash, ½ cwt. ..	1 1 9	24·4	18·9	Earing unevenly, 26th August; crop uneven; other remarks as applied to 8.
10. Dried Blood, ½ cwt. .. .. Superphosphate, 1 cwt. .. .. Sulphate of Potash, ½ cwt. ..	0 19 6	25·6	21·3	Earing fairly evenly, 26th August; crop more even than 9; height, about 3 ft.; fairly flaggy in places; grain good; heads well filled.
11. Control (unmanured)	..	22·6	19·8	Crop earing very unevenly, 24th August; height very uneven, from 20 in. to 3 ft. 6 in.; flaggy in places; inequalities of soil very clearly shown in crop; rusty in places on lower flag; heads fairly well filled; grain uneven, some slightly pinched where crop tip withered.
12. Dried Blood, ½ cwt. .. .. Thomas's Phosphate, 1 cwt. .. Sulphate of Potash, ½ cwt. ..	0 18 0	26·2	22·5	Crop earing fairly even, 24th August; height uneven, 3 ft. to 4 ft. 6 in.; flaggy in places; crop now thick; rusty lower flag where crop inclined to be flaggy; heads well filled; grain good.
13. Dried Blood, ½ cwt. .. .. Sulphate of Potash, ½ cwt.. .. Superphosphate, 1 cwt. .. .. Nitrate of lime, ½ cwt.	1 6 3	27·1	22·5	Crop earing fairly evenly, 24th August; height, uneven, 3 ft. 6 in. to 4 ft. 6 in.; block inclined to be flaggy; crop fairly thick; rusty, lower flag; head well filled; grain good.

NOTE.—It will be noticed that, notwithstanding that the soils of the two Control Blocks Nos. 4 and 11 are totally different—No. 4 being a sandy loam, whilst No. 11 has clayey soil, a clay pan, and a sandy loam rich in humus within its boundaries—the average yield for the two blocks over the 5 years is exactly the same.

Block 4.—Unmanured

Block 6.—Thomas's Phosphate. Yield, 22·6 bushels per acre.

PLATES 19 AND 20.—WINTER CEREALS AT ROMA STATE FARM.

Block 7.—Stable Manure, 15 tons per acre; ½ cwt. Superphosphate.
Yield, 26·6 bushels per acre.

Block 12.—Dried Blood, ½ cwt.; Thomas's Phosphate, 1 cwt.; Sulphate of Potash, ½ cwt.
Yield, 26·2 bushels per acre.

PLATES 21 AND 22.—WINTER CEREALS AT ROMA STATE FARM.

NOTES FROM KAMERUNGA STATE NURSERY FOR MARCH, 1915.

The Manager reports as follows:—

Meteorological.—Rainfall, 3·72 in., the average for the last 25 years being about 19 in.

Maximum temperature, 91·5 degrees.

Minimum temperature, 62 degrees.

Owing to the very dry conditions which have prevailed during the last three months, many crops have been partial or total failures. Gingers are almost a failure, being very late and growth weak.

Coffee.—The young trees are still looking well owing to the attention given to them; but the dry season has had the effect of making the crop ripen early, picking having already started, and anyone requiring seed should apply at once. Seed sown now should produce plants for putting out about October, provided moist enough conditions prevail. Ordinarily, I consider the end of June or beginning of July the best months to form nursery seed beds for coffee. Plants raised then would be ready for planting out from January on; but seed maturing now, if kept to that date, would be much weaker in germinating power than if sown during this month or May.

Some excellent young plants of the Tonquin Bean (*Dypterix odorata*)—raised from seed at the Brisbane Botanic Gardens—were received and planted out both at this Nursery and other parts of the Cairns and Mossman districts.

CHAMPION AYRSHIRE BULL—BRAE RISING STAR.

Mr. Thos. Jones, Manager of the State Farm, Warren, supplies the following interesting information on the pedigree of the sire of the newly imported Ayrshire bull Sun Yat, now available for service at the farm:—

BRAE RISING STAR, No. 8187, at 3 Years Old.

This great bull was champion Ayrshire bull of Scotland for the years 1911 and 1912, and is the sire of the recently imported bull Sun Yat 12501, at present situated at this farm.

The following notes may interest the breeders of Ayrshire cattle in Queensland:—

I have just received a letter from Mr. Howie, of Hillhouse, Kilmarnock, giving me some very interesting news concerning Brae Rising Star, as follows:—

Mr. Howie sold this great bull to Mr. Clements, of Netherton, in 1912, for £450, and has repurchased him for £500 to head his great herd

at Hillhouse. This step was taken when it was seen that the bull's progeny were likely to make good yielders. Three of his heifers have just finished their first year's records, as follows:—

Tibby II., champion as a 2 year old, 9,210 lb. milk, with 3·7 per cent. butter fat.

Blossom, 8,007 lb. milk, with 3·8 per cent.

Flossie, 9,099 lb. milk, with 4·2 per cent.

Brae Rising Star's dam, Whitehill Lily II., 17511, exported to U.S.A. in 1910. Record as a 4 year old, 856 gallons of milk, with 3·8 per cent., in 38 weeks.

PLATE 23.—AYRSHIRE BULL, BRAE RISING STAR, AT THREE YEARS OLD.

Mr. Howie mentions that with daughters like these the bull was cheap at £500.

The dam of Sun Yat, Knockterra Carolina 31626, on her first calf gave 8,391 lb. milk, with 3·8 per cent. (she calved in midwinter).

The newly imported bull Sun Yat is now available for service at Warren State Farm.

DISEASES AND TREATMENT OF ANIMALS.

The best book for the information of the stockowner on the diseases and treatment of animals is "Leeny's Home Doctoring," which may be obtained from Thomson Bros., booksellers, George street, Brisbane. The Agricultural Department does not issue books on diseases, but publishes pamphlets on various stock ailments common to this country. Useful information on these subjects is given in the "Queensland Agricultural Journal."

The Orchard.

BANANAS AT BUDERIM MOUNTAIN.

Through the courtesy of the Under Secretary, Department of Public Instruction, we are enabled to publish the following interesting annual return of banana manurial experiments at the Woombye State School, Buderim Mountain. The following useful deductions may be made therefrom:—

1. That as the supply of food in the soil is used up in "No Manure Plot" the returns show a decided falling away, which will be greater each year. Hence banana growing even on fairly good land soon becomes unprofitable if systematic manuring is not resorted to. (Plot land by analysis reported "very fair soil.")

2. That the supply of available potash in the soil is becoming exhausted in "No Potash Plot." (This plot produced average bunch last year, almost equal to "Complete Manure Plot.") As a result, a greater gap may be noticed this year in returns from "No Potash Plot" as compared with "Complete Manure No. 1 Plot." Hence manuring with "meatworks manure," "fertiliser," and such-like pays, but only to extent of £10 per acre, as compared with £93 when potash is added.

3. That, seeing no manure was applied till the latter part of November, complete manure with dried blood as a source of nitrogen is of more lasting benefit than complete manure with nitrate of lime as the nitrogen base.

In conclusion, it is gratifying to report that still greater interest on the part of local growers is being shown in the experimental work done, while those who have lately bought farms in the district are trusting wholly to the advice and information supplied at the school.

ANNUAL RETURN OF PLOT.

1st March, 1914, to 28th February, 1915.

—		No Manure.	No Potash.	Complete. No. 1.	Manure. No. 2.
No. of stools ..		7	7	7	22
No. of bunches		13 (15)	14 (16)	23 (20)	61 (53)
No. of dozen ..		134½ (206)	172½ (242)	332 (303)	790 (819)
Average per bunch		10·3 (13·7)	12·3 (15·1)	14·4 (15·2)	12·9 (15·4)
Average per stool		19·2 (29·4)	24·6 (34·5)	47·4 (43·2)	35·9 (37·2)
Value at 3d. per dozen	per stool	4s. 9½d. (7s. 4d.)	6s. 1½d. (8s. 7½d.)	11s. 10d. (10s. 9½d.)	8s. 11½d. (9s. 3d.)
	per acre	£71 17s. 6d. (£123 6s. 8d.)	£91 17s. 6d. (£150 18s. 9d.)	£177 10s. (£188 17s. 1d.)	£134 7s. 6d. (£162 12s. 8d.)
Increase due to manure	per stool	..	1s. 4d. (1s. 3½d.)	7s. 0½d. (3s. 5½d.)	4s. 2d. (1s. 11½d.)
	per acre	..	£20 (£27 12s. 1d.)	£105 12s. 6d. (£65 10s. 5d.)	£62 10s. (£39 5s. 5d.)
Gain after paying for manure	per stool	..	9½d. (9)	6s. 4d. (2s. 9d.)	2s. 10d. (7½d.)
	per acre	..	£10 11s. 6d. (£18 3s. 7d.)	£93 6s. (£53 3s. 11d.)	£39 6s. (£16 1s 5d.)

NOTE.—1. For this year's return 300 stools to an acre were counted; last year 350 stools were counted.
2. Figures in brackets are returns for year 1913-1914.
3. Manure was applied in November only, so that returns are practically from manure applied in the year 1913-1914.

(Sgd.) REG. G. BARTLETT,
Head Teacher,
State School, Buderim Mountain.

Science.

SOURCES OF COMMERCIAL POTASH.

With the check to imports of German potash caused by the war, and the consequent rise in price of all potash salts, American manufacturers may find it necessary to consider domestic sources of supply.

Most of the potassium compounds used in pharmacy to-day are derived in the first instance from the famous salt deposits of Stassfurt, Germany, where the element occurs as potassium chloride, in the mineral called silvine, and as magnesium-potassium chloride in carnallite. The "potash" of commerce is obtained by the leaching of ashes from land plants, the ashes of sugar beets from molasses residues, and in the purifications of sheep suint. The product of wood ashes is purified by repeated crystallisation from hot water and enters the market as "pearl-ash."

In a recent issue of the "Scientific American," a correspondent drew attention to beet-sugar molasses as a source of commercial potash and suggested that the production of potash salts from beet-sugar refuse might be profitably carried on in this country.

The French sugar-beet sugar contains a notable proportion of potash salts, and the recovery of potash from the waste material of the stills used in treating beet-sugar molasses was an industry of some importance prior to the introduction of German potash, which became available in far greater abundance than was possible with beet-sugar refuse.

It may, therefore, be opportune to direct attention to early efforts in this country to provide material for the manufacture of potash salts. In a paper contributed to the American Pharmaceutical Association in 1892, Prof. John Uri Lloyd recalled the fact that American potash was formerly an article of much importance, and was exported from this country in large quantities. Years ago a well-known American firm manufactured yellow prussiate of potash on a large scale. In the beginning of the work the crude potash was obtained principally from Michigan from forest stumpage, the ashes of the stumps being collected and leached in the final clearing up of the land. This potash, as shown in the paper by Prof. Lloyd, already referred to, was, as a rule, mixed with more or less common salt, in some instances being extraordinarily adulterated. The German potash, both carbonate and caustic, came along about the time the Michigan source was exhausted, and has continued to be used in chemical factories generally. Now that a scarcity of German supply impends it would seem that there must be an opportunity for the development of potash manufacture as a by-product of the beet-sugar industry, provided the American molasses of the beet contains the same proportion of potassium that was evidently present in the French sugar beet. Prof. Lloyd states that his firm used considerable quantities of beet potash imported from France, and the material was equal to the

German as a basic substance for the manufacture of yellow prussiate of potash, though, naturally, the supply was somewhat irregular. Prof. Lloyd thinks it likely that the crude molasses of the South contains an abundance of potash, which, if there is a containued famine in German potash, might well be investigated.

Meanwhile, it is encouraging to note from a recent statement by Secretary Lane of the Department of the Interior, that the home production of potash will be started at a plant in Searles, Cal., at an early date. The initial output will be only 5 tons a day, but the plant under construction is expected to ultimately produce 120 tons.—" Scientific American."

"THE SOILS OF NEW SOUTH WALES."

By H. I. JENSEN, D.Sc., Government Geologist of the Northern Territory, late of the Chemist's Board, N.S.W. Department of Agriculture.

By direction of the Minister of Agriculture of New South Wales, a most valuable book on " The Soils of New South Wales " has been issued, which is without doubt a very important addition to the literature of soil geology. The author, Mr. H. I. Jensen, has for over twenty years been engaged in the collection and analysis of farmers' soils throughout the mother State, and has now embodied in the above work the results of his researches. After pointing out how physical, biological, and chemical forces exert their influence in what is known as " rock-weathering," he shows how, whilst soil is continually being formed by these processes, it is also continually being removed by the kindred process of soil waste under the same influences, although biological agencies which stimulate rock-weathering do not favour soil waste to the same extent. " Indeed, many of them tend rather to hold back the soil, and to prevent it from being swept into the creeks. No doubt the movements of worms and other soil fauna, and the secretions of small animal organisms, bacteria, algae, and fungi in the soil, help to comminute it; but in so doing they render it more favourable to the growth of plants. Plants are active restrainers of soil waste . . . . their network of roots and their organic products of decay have the effect of binding the soil and of preventing its being swept away by heavy rains."

A valuable lesson on the connection between forests, floods, and rainfall, which should have been learned years ago by settlers, is given as to the devastation caused by floods due to the destruction of large areas of timbered country traversed by flooded rivers, but where the rainfall has annually lessened in proportion as the land is denuded of timber. We, in Queensland, have had bitter experience of the results of land clearing, in the washing away of the rich soil into the rivers and creeks, leaving the scrub farms in an impoverished state owing to the loss of the surface soils.

" Thus," writes the author, " man is an active promoter of soil waste, often quite unconsciously and with the best of intentions. By clearing forests on hill sides, he loosens the soil, and leaves it exposed

to torrents, which sweep it down more rapidly than rock decay replaces it. By cutting drains he often starts a storm-water channel which removes his soil at an alarming pace. By ploughing in the direction of the slope instead of at right angles to it, he hastens soil waste. By neglecting to maintain forest belts as wind-breaks, he allows prevalent winds to carry away the most fertile particles of soil from his newly-ploughed fields."

"Clearing the forests and draining and ploughing the lands are necessary proceedings to human existence. These things can, nevertheless, be done without skinning Nature—without giving the forces of destruction full play. Just as by our action we can call into operation the forces of Nature that destroy the soil, and ruin the land from an agricultural point of view, so we can, by a careful study of the country, so modulate our work that the forces of Nature will help us to preserve just as much of the soil as we require."

We quote in particular the above portions of the book, as they are of vital importance to the agriculturist and pastoralist, and may very easily be understood. Other chapters equally absorbing are devoted to a technical description of soils, to manures and their application, to irrigation and artesian wells, and a description of the alluvial soils of New South Wales, which apply equally to most of the soils of Queensland. The work, which is well illustrated, must prove of great value not only to the scientific reader, but also to the man on the land.

AUSTRALIAN WHEAT.

The following notes on the wheat position in Australia are taken from the "Producers' Agency" circular issued by H. M. Suttor and Company, Sydney:—

The wheat harvest of Australia, if it can be called such, for the past season, works out at about 25,053,950 bushels, provided that the crop of New South Wales was not less than 14,000,000 bushels. Victoria accounts for 3,940,950; South Australia, 2,600,000; West Australia, 2,513,000; Queensland, 1,500,000; Tasmania, 500,000. The requirements for food and seed will not be less than 35,000,000 bushels, which leaves a deficiency of about 10,000,000 bushels to be imported. This is the greatest all-round failure since 1902, when the total yield was 12,378,000 bushels; with the different and unusual result that New South Wales has more than the total of all the other States together. In the previous harvest the yield was 103,350,000 bushels. Past wheat history shows that heavy yields follow failures, and the probability is that the 1915 crop will be a heavy one also. In 1903 the imports of wheat were 9,115,000 bushels. Flour, 70,000 tons; total valued at £2,600,000. This year the import will probably reach a value of £4,000,000. Last year our exports of wheat and flour were valued at £11,500,000, so that Australia, as compared with last year, will have a direct wheat loss of £15,500,000.

The High Court has decided that the Wheat Acquisition Bill, which the Interstate Commission declared invalid, is valid, and stands good.

Entomology.

COPING WITH THE CANE GRUB.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

During the coming autumn and winter it is proposed, as stated last month, to investigate some of the more promising means of coping with the grub stage of cane beetles, and it may not be out of place in the present report to introduce this side of the question to our growers by briefly enumerating the various recognised control measures that may be brought to bear on such research work, and which employed collectively could hardly fail to produce highly beneficial results.

I have previously pointed out that ideal methods of combating this notorious beetle are admittedly those in which we succeed best in preventing oviposition by destroying as many egg-laden females as possible; but at the same time it would be well to bear in mind that the greater length of the larval existence compensates to some extent for its secondary importance, since it enables us to practise control measures throughout a period of at least six months whilst the sphere of action of the pest underground is greatly restricted, and it is subjected also to the injurious influences of certain forms of climatic and natural control that do not affect the adult beetle stage.

In the list given below I have attempted to arrange the principal preventive and remedial methods in numerical order of merit, determined by their relative claims to efficiency and practicability although irrespective of individual value at the present time. No. 3, for example, is already extensively practised and of great economic importance, but theoretically No. 1, which is still in the experimental stage, must ultimately prove superior to it, as under such ideal soil treatment many larvæ would succumb a few days after hatching and the remainder before being able to work appreciable damage; whereas on the other hand grubs exposed to view while ploughing or pulling up stools, &c., represent but a small proportion of the number actually present in the soil, and many, being of fair size, have already injured the crops; moreover, such destruction of second and third stage larvæ entails the probable loss of a small percentage of useful parasites.

CONTROL OF GRUB STAGE.

DIRECT AND REMEDIAL METHODS.

1. Incorporating with the whole of the soil by ploughing and other cultural operations some enduring substance (preferably cheap and non-poisonous) that shall prove quickly fatal to grubs and at the same time possess manurial properties.
2. The application to cane sets or furrows of an inexpensive deterrent sufficiently obnoxious and durable to protect a limited area containing main roots from invasion during most of the growing season.

4. Fumigation of the soil with a gas deadly to animal life but having, if possible, a stimulating effect on vegetation.

7. Applying an insecticidal solution to the main roots by pouring same into a trench against base of stools.

Whilst striving to attain ideal results from an application of such speculative remedies as Nos. 1, 2, 6, we must not neglect the claims of more practical though commonplace control measures, some of which, in addition to being easily carried out, cost comparatively little and are beneficial both from a cultural as well as an entomological standpoint (*see* Nos. 3, 5, 8, 9). All influences affecting the economy of cane grubs as a direct result of agricultural operations should be closely studied, the probability being that future developments in this connection may lead to issues of the first importance. Results brought about by such factors, for instance, as the physical character of soils, manuring, &c., are naturally influenced more or less by weather conditions which tend to regulate the subterranean movements and position of grubs and thereby affect indirectly the habits of their parasitic enemies.

PREVENTIVE METHODS.

3. Collecting grubs by hand whenever possible, both from behind the plough and under trash in hot weather.

5. Working the soil, if practicable, whenever grubs are known to be close to the surface and can easily be exposed to the influence of intense solar heat and attack from natural foes.

8. Encouraging a vigorous root development and conditions favourable to conservation of moisture by judicious manuring and thorough cultivation.

10. Maintaining the soil in a friable state and free from weeds throughout the growing season.

A large percentage of cane grubs perish annually, as a necessary outcome of the controlling influence of various natural laws designed to prevent their undue increase. Unfortunately the establishment of artificial conditions and consequent destruction of native flora over vast tracts of country has interfered with the complex workings of these laws, with the result that our grey-back beetle and other insects, being induced to substitute cultivated plants for their natural food, have gradually acquired a liking for the former and become serious pests.

The following procedure will serve in a measure to counteract this evil:—

NATURAL CONTROL.

6. Infecting the soil artificially with the "Green Muscardine" fungus, or with other parasitic diseases that may be found readily procurable and sufficiently effective to warrant the expense of such distribution.

9. Promoting the protection of all indigenous grub-eating mammals and birds; together with the preservation when feasible of insect enemies of cane beetles.

11. The introduction from other countries of special parasitic and predaceous insects that are known to attack grubs of scarabæidæ closely related to our own species.

12. The destruction where practicable of a large bombylid hyperparasite which materially checks the increase of our parasitic "digger wasps" by preying on the larvæ of these useful insects.

Other methods of controlling the grub stage of cane beetles could be mentioned, but the twelve already enumerated will enable growers to realise the nature of operations likely to be serviceable when fighting the larval form of this pest.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1915.	Mar., 1914.
North Coast.	In.		In.	In.
Atherton	9·55	13	0·69	13·10
Cairns	20·20	27	4·74	14·81
Cardwell	15·65	27	0·99	28·70
Cooktown	15·17	27	2·58	16·34
Herberton	8·62	27	0·58	14·01
Ingham	16·04	22	3·87	43·66
Innisfail	26·78	27	3·44	24·96
Mossman	25·26	5	4·80	32·31
Townsville	8·58	30	0·02	14·34
Central Coast.				
Ayr	8·40	27	0·17	11·24
Bowen	6·43	27	0·09	7·58
Charters Towers ...	3·92	27	2·32	4·09
Mackay	11·47	27	2·37	13·35
Proserpine	14·69	11	1·35	17 77
St. Lawrence ...	6·71	27	Nil	2·87
South Coast.				
Biggenden	4·89	14	Nil	11·09
Bundaberg	6·40	27	0·07	5·60
Brisbane	6·09	64	0·11	7·75
Childers	5·64	19	0·15	10·49
Crohamhurst ...	13·44	22	0·25	16·92
Esk	5·39	27	0·48	3·83
Gayndah	3·90	27	Nil	9·98
Gympie	7·21	27	0·02	9·73
Glasshouse M'tains	11·69	6	0·10	11·25
Kilkivan	4·74	27	Nil	8·93
Maryborough ...	7·23	27	0·29	12·74
South Coast—continued:	In.		In.	In.
Nanango	3·75	27	0·12	5·34
Rockhampton ...	5·54	27	0·03	5·53
Woodford	9·29	27	0·06	6·34
Yandina	10·82	21	0·06	14·06
Darling Downs.				
Dalby	3·65	27	0·39	3·55
Emu Vale	2·99	17	0·13	6·40
Jimbour	2·84	24	0·25	2·17
Miles	3·07	27	Nil	3·32
Stanthorpe ...	3·33	27	0·36	6·08
Toowoomba ...	4·68	27	0·27	4·28
Warwick	3·07	27	0·80	6·31
Maranoa.				
Roma	4·09	25	0·10	2·05
State Farms, &c.				
Gatton College ...	4·22	14	0·64	3·88
Gindie	3·06	13	0·07	2·91
Kamerunga Nurs'y	18·24	23	3·72	17·76
Kairi	6·11	2	0·75	11·46
Sugar Experiment Station, Mackay	13·53	16	3·97	12·49
Bungeworgorai ...	1·99	2	Nil	3·98
Warren	2·16	2	Nil	4·32
Hermitage ...	3·42	7	0·46	5·88

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

General Notes.

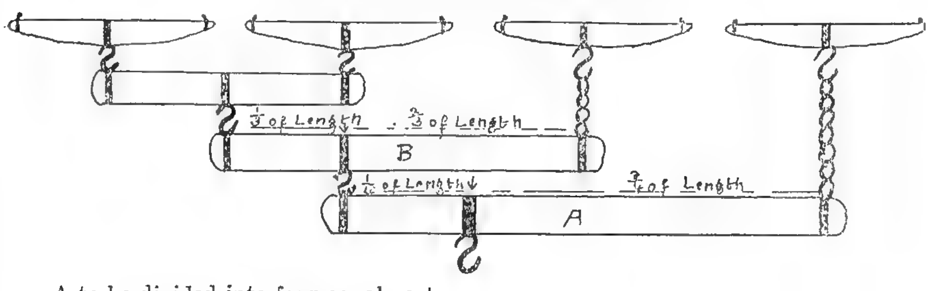
GOONDIWINDI PASTORAL AND AGRICULTURAL SOCIETY.

The secretary notifies that in consequence of the continued dry weather, the show fixed for 21st and 22nd April had to be abandoned.

DESTROYING WHITE ANTS.

There is no need to make a solution of arsenic to destroy white ants. It is best to use dry arsenic and put a small quantity into places where the ants are working. By simply putting a knife point full into one of the cracks in stumps, or into their working channels, the whole lot may be poisoned, as the live ants eat the poisoned ones.

A FOUR-HORSE PLOUGH BAR.



A to be divided into four equal parts.

B to be divided into three equal parts.

Bar marked A to take draught at ¼ from end, and bar marked B to take draught from ⅓.

Width of one-horse bars left to discretion of user, according to class of horse (medium or heavy draught) used.

Above is an illustration of a four-horse bar for a plough, so arranged that the right-hand horse can walk comfortably in the furrow, and the other three on the land. Drawn by Mr. A. E. Gibson, of this Department.

Answers to Correspondents.

UTILISING WILTED MAIZE CROPS.

Y. V. H., Mundubbera—

Wilted crops of maize such as yours can be most profitably turned to account by making into ensilage; but as you state you do not possess any stock this phase of the question cannot be taken account of. Maize cut and cured into a form of hay, in stooks, makes a useful chaff-forage for dairy stock, particularly when they have access to other classes of richer foods like lucerne or cowpeas. There is no sale for maize chaff under normal conditions in Queensland. It is entirely a product for use on the farm.

When maize fails to set a crop of grain, the only alternatives are those mentioned above, or else the fodder can be cut and fed direct to stock.

BEANS, PEAS, AND GREEN CROPS FOR ENRICHING THE SOIL.

F. J. HULL, Cardwell—

Mr. H. C. Quodling, Inspector of Agriculture, replies as follows to your questions:—

Q. 1.—Whether your department supplies manure to farmers, and if so at what price? Can you supply 1 ton of meatworks manure?

A. The department does not deal in manures, but most meatworks sell their fertilisers in small lots.

Q. 2.—What is the best sort of leguminous plant to use for manuring an orange orchard (a non-runner)?

A. Nearly all the best leguminous cover crops are runners and are preferred for this reason, as they keep the ground well covered. The place under the trees should always be kept free from crop and eventually be mulched with some of the cut down green crop. Mauritius beans are one of the best cover crops for the North. Upright growing cowpeas might be tried as well as the Mauritius beans.

Q. 3.—Is the Pigeon Pea a legume, and does it enrich or impoverish the land?

A. Pigeon Pea is a legume and enriches the soil, but it is liable to grow too salt and rank. It is more suitable for land lying fallow.

Q. 4.—With legumes what is the difference in manure value between a crop ploughed in while growing and the same crop left to seed and then ploughed in after the seed has been gathered and the plant is dead and dry?

A. The best time to plough green crops under is at time of seeding, but good results are obtained even after seeds are allowed to ripen as the ground is covered with dead leaves and vines.

HEAVIEST COB OF MAIZE.

E. A. HOFFMANN, Guluguba.—

We have obtained the weight of a single cob of maize. Thoroughly dried it turned the scale at a little over 14 oz. This was not, however, a competition cob. Twelve such ears would, of course, weigh 10½ lb.

PRICKLY-PEAR ASH.

J. S., Inglewood—

There is no market for crude prickly-pear ash, as this has to be manufactured into sulphate before it can be used as a fertiliser. The best way would be to prepare a sample of such ash and send it to a wholesale chemist, such as Elliott Bros., or Taylor and Colledge, of this city, for valuation.

SPLIT PEAS.

J. F. KEANE, Carbeen—

For split peas, choose those eld peas which produce small pods and peas, which divide into halves easily, and of which the skin of the pea is loose. It will be found that, in threshing such kinds, the seeds split into halves, and that, in winnowing, the skins are blown off, leaving the article ready for market.

SEX OF PAPAW TREES.

A. H. F., Diddillibah—

Mr. C. Ross, F.R.H.S., Instructor in Fruit Culture, says:—"There is no way of telling the male from the female papaw whilst the plants are young. The safest way to insure having all female trees is to graft all seedlings, male and female alike, when from one-quarter to one inch in thickness. If the cleft graft is performed, very few misses will occur."

POISONING TREES WITH ARSENIC AND SODA.

Many complaints have been received as to the want of effectiveness in ring-barking. This seems to be principally due to the fact that trees are ring-barked or sapped in the wrong season of the year.

Some varieties of trees, notably the round-leaf box, sucker and throw up shoots from surface roots if the trees are not dealt with when the sap is up, *i.e.*, when they are in full growth. April and May are probably the most suitable months for ring-barking.

The arsenical mixture used for killing trees is made up in the following proportions:—2 lb. arsenic to 1 lb. caustic soda to 2 gallons of water. This is a very concentrated solution and care must be taken to keep all utensils containing same away from stock. Animals should not be allowed access to portions of a paddock dealt with in this way for some weeks afterwards.

The easiest method for distributing the arsenical solution is to fit a tap into a kerosene tin and attach a 2 ft. length of rubber hose to the tap; solder D's to the sides and bottom of the kerosene tin, so that straps can be used to carry it about; a screw-top or other water-tight lid is necessary.

When preparing arsenical solutions the ingredients should be dissolved by boiling for about an hour; the fumes should not be inhaled.

Although there is probably more danger to stock where plants like prickly-pear have been "sprayed" with a poisonous compound, the advice given in previous part of letter is to be regarded as precautionary.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1915.

Article.		APRIL. Prices.
Bacon	lb.	11½d.
Bran (Mill price)	ton	£10
Butter	cwt.	142s.
Chaff, Mixed	ton	£7 10s. to £8
Chaff, Oaten	„	£10 to £12
Chaff, Lucerne	„	£8
Chaff, Wheaten	„	£4 5s. to £5
Cheese	lb.	8¾d. to 9d.
Flour	ton	...
Hams	lb.	1s. 2d.
Hay, Oaten	ton	£13 10s.
Hay, Lucerne (Prime)	„	£7 to £7 10s.
Honey	lb.	3d. to 3¼d.
Maize	bush.	5s. 8d.
Oats	„	6s.
Onions	ton	£8 10s.
Peanuts	lb.	2¾d. to 4d.
Pollard (Mill price)	ton	£12
Potatoes	„	£9 to £10
Potatoes (Sweet)	cwt.	4s. 6d.
Pumpkins	ton	£6 5s.
Eggs	doz.	1s. 5d. to 2s. 1d.
Fowls	pair	3s. 6d. to 4s. 6d.
Ducks, English	„	3s. 3d.
Ducks, Muscovy	„	4s. 3d.
Turkeys (Hens)	„	6s. to 7s.
Turkeys (Gobblers)	„	9s. to 11s.
Wheat (Seed)	bush.	9s.

SOUTHERN FRUIT MARKETS.

Article.	APRIL. Prices.
Bananas (Queensland), per case	8s. to 12s.
Bananas (Fiji), per case	22s. 6d. to 23s. 6d.
Bananas (G.M.), per case	...
Mangoes, per case	...
Oranges (Navel), per case	...
Oranges, Italian, per case	...
Oranges (Other), per case	...
Passion Fruit, per half-bushel case	1s. 6d. to 3s.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	6s. to 7s.
Pineapples (Ripleys), per case	3s. 6d. to 6s.
Pineapples (Common), per case	3s. to 5s.
Tomatoes, per quarter-case	3s. 6d. to 5s. 6d.
Persimmons, per half-case	...

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	APRIL. Prices.
Apples (American), Eating, per case	8s. to 9s.
Apples (Local), per case	5s. to 7s.
Apples, Cooking, per case	8s. to 9s.
Bananas (Cavendish), per dozen	1½d. to 4½d.
Bananas (Sugar), per dozen	1½d. to 4½d.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	4s. to 6s.
Lemons (Local), per case	3s. to 5s.
Lemons (Italian), per case	9s. to 10s.
Mandarins (Northern), per case	7s. to 8s.
Oranges (other), per case	3s. to 6s. 6d.
Passion Fruit, per case	4s. to 8s. 6d.
Peanuts, per pound	2¾d. to 4d.
Pears (Victorian), per case	10s. to 11s.
Persimmons, per quarter-case	3s. 6d. to 4s.
Pineapples (Ripley), per dozen	3s. to 5s.
Pineapples (Smooth), per dozen	2s. to 4s. 6d.
Rosellas, per sugar bag	2s. to 4s.
Tomatoes, per quarter-case	3s. 6d. to 7s. 6d.

VEGETABLES.

Cabbages	per dozen	4s. to 10s.
Peas	per sugar bag	7s. to 10s. 6d.
Beans	,, ,,	5s. 6d. to 9s.
Parsnips	per dozen bunches	6d. to 1s. 3d.
Carrots	,, ,,	1s. 6d. to 1s. 9d.
Cucumbers	per dozen	6d. to 1s. 9d.
Custard Marrows	,,	2s. 6d. to 5s.
Vegetable Marrows	,,	3s. to 5s. 6d.
Chocos	per quarter-case	2s. to 2s. 6d.
Table Pumpkins	per dozen	3s. to 3s. 6d.
Tomatoes	per quarter-case	3s. 6d. to 7s. 6d.

TOP PRICES, ENOGGERA YARDS, MARCH, 1915.

Animal.	MARCH. Prices.
Bullocks	£14 15s. to £18
Cows	£10 12s. 6d. to £12 7s. 6d.
Merino Wethers	22s. 3d.
Crossbred Wethers	21s.
Merino Ewes	19s. 9d.
Crossbred Ewes	22s.
Lambs	17s. 6d.
Pigs (Porkers)	46s.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	May.		June.		July.		August.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·17	6·31	5·0	6·39	5·3	6·30	5·18
2	6·14	5·16	6·31	5·0	6·39	5·3	6·30	5·18
3	6·15	5·15	6·32	5·0	6·39	5·3	6·29	5·19
4	6·15	5·14	6·32	5·0	6·40	5·4	6·28	5·20
5	6·16	5·13	6·33	4·59	6·40	5·4	6·27	5·21
6	6·17	5·12	6·33	4·59	6·40	5·4	6·27	5·21
7	6·17	5·12	6·34	4·59	6·40	5·5	6·26	5·21
8	6·18	5·11	6·34	4·59	6·40	5·5	6·25	5·22
9	6·18	5·11	6·34	4·59	6·40	5·5	6·24	5·22
10	6·19	5·10	6·35	4·59	6·40	5·6	6·24	5·22
11	6·19	5·10	6·35	4·59	6·39	5·6	6·23	5·23
12	6·20	5·9	6·35	4·59	6·39	5·6	6·23	5·23
13	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·24
14	6·20	5·8	6·36	4·59	6·39	5·7	6·21	5·25
15	6·21	5·8	6·36	5·0	38	5·8	6·20	5·26
16	6·21	5·7	6·36	5·0	6·38	5·8	6·19	5·26
17	6·22	5·6	6·37	5·0	6·38	5·9	6·18	5·26
18	6·22	5·5	6·37	5·0	6·37	5·10	6·17	5·27
19	6·23	5·5	6·37	5·0	6·37	5·11	6·16	5·27
20	6·23	5·4	6·38	5·0	6·36	5·12	6·15	5·27
21	6·24	5·4	6·38	5·0	6·36	5·12	6·14	5·28
22	6·24	5·4	6·38	5·0	6·36	5·12	6·13	5·28
23	6·25	5·3	6·38	5·0	6·35	5·13	6·12	5·29
24	6·25	5·3	6·38	5·1	6·35	5·13	6·11	5·29
25	6·26	5·3	6·39	5·1	6·35	5·13	6·10	5·30
26	6·26	5·2	6·39	5·1	6·34	5·14	6·9	5·30
27	6·27	5·2	6·39	5·2	6·34	5·14	6·8	5·31
28	6·28	5·2	6·39	5·2	6·33	5·15	6·7	5·31
29	6·29	5·1	6·39	5·2	6·32	5·16	6·6	5·32
30	6·30	5·1	6·39	5·3	6·31	5·17	6·5	5·32
31	6·30	5·1	...	...	6·31	5·17	6·5	5·33

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H. M.
6 May	☽	Last Quarter	3 22 p.m.
14 „	●	New Moon	1 31 „
22 „	☾	First Quarter	2 50 „
29 „	○	Full Moon	7 33 a.m.

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

5 June	☽	Last Quarter	2 32 a.m.
13 „	●	New Moon	4 57 „
21 „	☾	First Quarter	12 24 „
27 „	○	Full Moon	2 27 p.m.

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

4 July	☽	Last Quarter	3 54 p.m.
12 „	●	New Moon	7 30 „
20 „	☾	First Quarter	7 9 a.m.
26 „	○	Full Moon	10 11 p.m.

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m., and at its nearest on the 24th at 3·24 p.m.

3 Aug.	☽	Last Quarter	7 27 a.m.
11 „	●	New Moon	8 52 „
18 „	☾	First Quarter	12 17 p.m.
25 „	○	Full Moon	7 40 a.m.

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence, insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but, obviously, this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August, or at the earliest, in warm, early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills lay them on a thick layer of sand, then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them. Then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will not be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas.

In our Farm and Garden Notes for May, published in the April issue of the Journal, it was inadvertently stated that Messrs. Kitchen

and Sons and Messrs. Joyce Bros. were purchasers of seed cotton. These firms, we understand, are not at present cotton buyers. The Department of Agriculture and Stock are still buyers of this product.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted, also horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds amongst the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses, and tie up, without pruning, to trellis or stakes, the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow a first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondii*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate

with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days, thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

Orchard Notes for June.

THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when the Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay, but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and injure the pines growing thereon severely, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the spring crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in spring means good bunches of bananas and early ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit, but where citrus trees are heavily loaded, the pruning should be put off till after the spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely, first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little new growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to over-produce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and, where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following spring.

As soon as any part of the orchard is pruned, gather up the prunings, and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine pruning can be done at any time now in the Roma or Central districts. Tree pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. III. JUNE, 1915. PART 6.

Agriculture.

SISAL HEMP.

Since the year 1897, when this Journal came into existence, we have advocated the cultivation of sisal hemp. We have repeatedly pointed out that waste lands (dry and rocky), useless for any other marketable vegetable product, could be utilised for the production of a crop which, although, as we shall show, subject to fluctuations in price, yet, under the most adverse climatic conditions of drought, when all other crops suffer and yield not only no profit but prove an absolute loss to the farmer, is able to hold its own and give substantial returns to the grower.

The principal source of this fibre has, for a long series of years, been Mexico, and of later years East Africa. Now, however, that both these countries are handicapped as to their agricultural products, especially Mexico, the urgent demand for sisal hemp cannot be complied with. Had the farmers of Queensland utilised some of their waste lands by planting sisal hemp, which after the first or second year requires no attention, they would to-day be reaping a highly profitable harvest. We have, in previous articles, shown how a clear profit of £12 per acre has been made in a few districts in the State. The profits are, of course, regulated by supply and demand, and on several occasions the demand has so far exceeded the supply that prices have risen by over 100 per cent.

For instance, to-day fair seconds hemp is quoted at £37 per ton. A crop of sisal four or five years old will amount to 1 ton, and even more, of fibre per acre, and the cost of production, as shown by a grower at Childers, is about £12 per ton. Only twice since 1879 has the price

of sisal fibre exceeded this figure. That was in 1889 and 1902, when the price rose to £50 per ton. In 1888, and again in 1903-4-5-6 and '7, fair seconds brought £37 per ton. The lowest prices were in 1893, £17; 1894, £15; 1895, £18; 1896, £19; and 1897, £17 per ton. Then in 1897 the price suddenly rose to £27 per ton; in 1898 the price was £33; in 1900, £37; and in 1902, £50 per ton; in 1908 it fell to £25, and in 1909 it was steady at £27. To-day (1st May) it is impossible to say what the value may be. Even Furcrea (Mauritius hemp) is worth £34 per ton. Messrs. Landauer and Co., London, in their trade circular on the fibre market (17th March), write as follows:—

"What would happen in this market if any heavy demand set in, in view of the critical position of Mexican sisal hemp, is best left to the imagination. We estimate sales for the week at 10/12,000 bales, which includes a very fair percentage of business done with consumers. Closing values are £28 10s. to £28 15s. for good seconds, £36 10s. to £37 for fair current, February/April and March/May shipment.

"Spot hemp has been in heavy demand, but very little offering, and the value has advanced to the basis of £29 for good seconds.

"*Mexican Sisal Hemp.*—American twine manufacturers have suffered a great surprise, and view with considerable alarm the prospect of being deprived of their supplies, so urgently needed for the manufacture of binder twine for the approaching season. The port of Progreso has suddenly been closed, and all communications, both by mail and cable, suspended. It is impossible to over-estimate the seriousness of the position for American twine producers, seeing that they annually consume fully seven-eighths of the total supply of Mexican sisal hemp, in addition to having taken for some years past the bulk of the production of kindred articles such as Java, East African, and Bahama sisal, supplies of which are now also cut off. The position is a most critical one when it is reflected that the total production and consumption of the various descriptions of sisal hemp are approximately double in weight the production of Manila hemp. With these various factors to face, no one can predict what may be in store for the fibre markets in the near future. It seems fairly certain that the value of all hemps that are available will be greatly enhanced, and when the heavy demand (which seems inevitable) sets in we may easily experience a 'panicy' market. It is to be hoped that the Government of the United States will succeed in getting the port of Progreso reopened; otherwise it is difficult to see where the raw material is to come from which is necessary for the manufacture of binder twine for the approaching harvest, and the critical nature of the position becomes more pronounced when one appreciates the extreme difficulty experienced by Manila shippers to secure freight, and in addition the fact that the approaching new system of grading in the Philippines adds to the troubles of shippers in trading to any large extent."

Department of Agriculture and Stock, Queensland.

SEEDS FOR SALE.

SEED MAIZE.

The Department of Agriculture and Stock has a limited quantity of the following varieties for sale at 8s. per bushel, f.o.b. Brisbane.

Remittance to accompany order.

The quantity of seed grain which will be supplied to any individual applicant will not exceed three bushels, and orders will be attended to according to priority of application.

In the event of orders exceeding the available supply of any one variety, the right of substituting another is reserved.

The seed offered has its origin from grain imported from U.S. America:—

Golden Beauty	Hildreth
Hiawatha Yellow Dent	Pride of the North
Reid's Yellow Dent	Boone County White

SORGHUMS AND MILLETS.

The Department of Agriculture and Stock has a limited quantity of the following varieties for sale at 4d. per lb., f.o.b. Brisbane.

Remittance to accompany order. In the event of having to forward by parcel post, the cost of same should be included with remittance.

The quantity of seed grain to be supplied to any individual applicant will not exceed 10 lb., and orders will be attended to according to priority of application.

In the event of orders exceeding the available supply of any one variety, the right of substituting another is reserved; if this arrangement is not acceptable, notification to this effect should be made when ordering.

The seed offered has its origin from grain imported from U.S. America, the varieties having been introduced there from different parts of the globe.

The non-saccharine sorghums came here with a reputation for drought resistance:—

Oklahoma Dwarf Broom Millet	Black-hulled Kaffir Corn (non-saccharine)
Improved Evergreen Millet	Valley Kaoliang (non-saccharine)
Dwarf Milo (non-saccharine)	Soudan Dhoura (non-saccharine)
Shantung Dwarf Kaoliang (non-saccharine)	Planters' Friend (saccharine)
Cream Milo (non-saccharine)	Early Amber Cane (saccharine)
Standard Milo (non-saccharine)	Sorghum Saccharatum (saccharine)

Pastoral.

JUDGING A BULLOCK'S WEIGHT.

Messrs. Armour and Co., Chicago, who have brought the science of cattle-buying to a fine point, publish in "Armco," their house magazine, their buyers' methods for judging the weight of cattle:—

"To the experienced buyer there are quite a number of ways to make certain of the beef-yielding qualities of any bullock or steer.

"These points stand out boldly before the eye of a man who is constantly in the game for many years, and who trains himself to look for and see them. Among the first points an expert buyer looks for are a fat wattle under an animal's jaw and width across the shoulders. The shoulders should be thick and square clear up to the neck, so that there will be a good yield of beef all the way along. If a bullock is broad along the back, but sharp at the neck, there is want of beef there.

"Another way to judge a bullock is from a point several feet straight behind him. Notice the conformation of his hips and back. If he has been thoroughly fed, his 'pants' will be tight, and he will be straight and flat across the buttock. If not, he will be divided and have the appearance of being split all the way up, which indicates a lack of meat between the legs or in the rounds.

"Again, get him into action, and when he stops notice whether he pushes a good flank. If he does, this indicates that a good yield of beef can be expected from him."—"New Zealand Farmer."

LIBERATING POTASH.

While the supply of potash manures from Germany has been stopped by the war, and a good many users of kainit and sulphate of potash will now have to do without these fertilisers, it is well to remember that there is a natural supply of potash in the ground which may be locked up. While they could get constant supplies of potash many farmers were content to keep adding, but the time has come to look for the magic key which unlocks the door, liberates the potash, and makes it available for crops. Our forefathers used this key for the same purpose, but perhaps without quite knowing why, years before the potash mines in Germany were opened up, and the key was a dressing of lime. If we return to it again, and this valuable essential to fertility is applied to land requiring it, the door will be unlocked and Nature's reserve of potash be liberated in a form that crops can avail themselves of it. If this hint be taken, and we utilise other sources of potash that are available, we shall carry through until potassic salts are again available.—"Garden and Field."

The Horse.

THE HIGHLAND PONY.

BY P. R. GORDON.

Although the extensive adoption of mechanical traction will not bring about a serious decrease in the demand for horses, it will, to a considerable extent, limit the demand for heavy and light draught horses for road traffic. Its effects are seen in cities where the motor-car has completely superseded the stylish carriages and pairs, and to a large and constantly increasing extent the buggy, the van, and even the lorry horse. Even in the far West, station managers have abandoned the favourite hack for the motor-car on station work. While this change is developing, however, there is an ever-increasing use found for the pony, and among the various native breeds of ponies the Highland pony holds a high position. I am indebted to a friend, a fellow-countryman, for much valuable information about the Highland pony, his experience of the breed dating many years subsequent to the date of my leaving Scotland.

There have always been small horses in Britain—at all events, in Scotland. The remains found recently in the Roman camp at Newstead include horse bones which indicate that the native horses were from 11 to 13 hands in height. It is impossible to disregard the limiting influence of local conditions, which prescribe to each district, at each period of its development, the size and type of horse which can be maintained within it. Therefore, the original Highland pony is not a horse reduced in size by the scarcity of herbage; but the horse whose type and qualities favoured its survival in those conditions which prohibited any increase in size. These same conditions fixed other characteristics as well. They prescribed and produced a degree of vigour and robustness fitted for its maintenance of life in adversity and for its performance of feats of labour and endurance that would otherwise be impossible for so small a frame. The original Highland pony—small, robust, gay, shaggy, alert, strong-boned, short-eared, large-eyed—is the product of natural conditions and human needs in the Highlands. It is a definite race established by long selection, having characteristics indelibly fixed. It has already been said that within this variety of race there remains real and very considerable variety of type—a variety hardly less great than that which we find between larger breeds of horses; and the fact that the various types do not breed true, but are interchangeable, points to a far back mixture of races. Yet in its widely varying development the pony remains a fixed breed. Highland ponies may be divided into three classes. First: The representatives of the original pony of Baria and the outer islands, in height from 12·2 to 13·3. They have good hard legs and feet; their heads are rather large and plain, and their shoulders rather straight, but they are hardy little

animals, well suited to stand exposure and poor feeding, and when brought on to good keep it is wonderful how they improve in width and rotundity. Second: The high-class riding pony of the West Highlands, in height 13·2 to 14·2. They belong to Mull, Tirèe, Skye, and Uist, and show a very strong cross of Arab blood, believed to have come with the Spanish Armada horses or Arab chargers brought home by Highland officers. These ponies have beautiful heads and good shoulders; are good all over, and are famous for staying through long journeys under heavy weights and on poor keep. Third: The Highland garron, belonging chiefly to Perthshire and the central Highlands. They have good

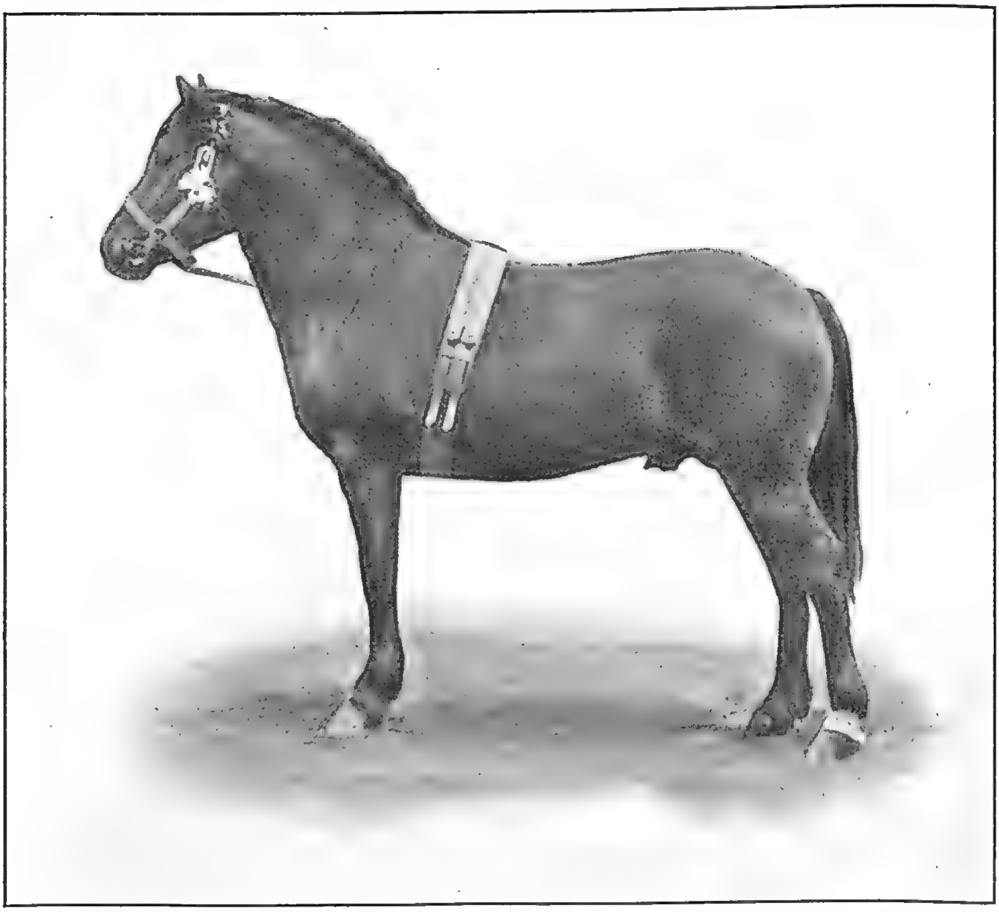


PLATE 24.—HIGHLAND PONY, MOUNTAINEER, 3 years old, first in the Heavy Stallion Class, and winner of the President's Medal as best Highland Pony at the Highland and Agricultural Society's Show, Hawick, 1914.

game heads, bold eyes, shoulder a little too straight, and back long, with the best of legs and feet; a good tuft of hair on the heels, and a well-set-on tail. They are short but strong in the pastern, with a very short distance between knee and fetlock. They have short ears, good eyes, sagacious-looking heads with great strength of jaw and big, wide, open, clean-cut nostrils. There is no trace of Arab blood in their origin. They are up to 15 hands, and are the biggest and most substantially built pure-bred ponies in Scotland—the majority of them strong enough

to pull with ease a ton load on a macadamised road. They are unequalled hill ponies for staying power, sure-footed, and for carrying heavy loads of deer and taking the sportsmen to the shooting ground. They possess the strength of the cart-horse with the nuggety built steep powerful shoulders and low withers of the best normal type of pony.

The Highland pony has much to commend it to Australia for the production of military horses, which will be a profitable pursuit for many years to come; its reputation for such purposes has already been recognised. The Boer war so well established its fame as the *beau ideal* of a hard military horse, leaving a most enviable record as to their hardiness and utility. One has only to read of the feats of Lovat's scouts in the South African campaign to understand the estimation in which they are held and the strong demand that has sprung up in the United States and the Argentine for Highland sires to cross on thoroughbred mares. If this were applied to Australia, where our light horses are on the "racy" side, an important industry would at once spring up, and a perfect type of military horse would be evolved that would bring wealth to our country.

Since the above was written, an article has appeared in the Press in which the writer states that the present war has shown that the skin of the English thoroughbred horse is too thin and delicate to stand the rough usage and riding of a battlefield, resulting in back and girth galls, while the French war horse, which is strongly impregnated with the blood of the Percheron, having a less sensitive skin, is faulty both in limbs and feet; and the writer fully concurs with the oft-expressed opinion that the best type of a battlefield horse is a Highland pony sire crossed on a thoroughbred mare.

WORMS IN HORSES.

The first symptoms of worms are a staring coat, tucked-up flanks, loss of condition, and usually a ravenous appetite. When those symptoms are noticed, the animal should be given 2 oz. of turpentine and 1 pint of raw linseed oil on an empty stomach, followed daily with the following powder in dry food:—Sulphate of iron, 4 drs.; tartar emetic, 1 dr.

ANOTHER SOURCE OF POTASH.

The "Board of Trade Journal" for 14th January, 1915, states that the most promising American source of potash is found to be the annual crop of giant kelp on the Pacific coast. The area of the commercially available beds aggregates nearly 400 square miles, capable of yielding annually, either as dried kelp or as potassium chloride, over six times the present consumption of soluble potash salts in the United States, or something more than the world's present production. The development of a great potash-producing industry in the United States seems now to be a matter of time only.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1915.

The twelfth egg-laying competition held here commenced on 1st April, with 53 competing pens, made up as follows:—40 pens White Leghorns, 7 Black Orpingtons, 2 S.L. Wyandottes, 2 Rhode Island Reds, and 1 each Barred Plymouth Rocks and Brown Leghorns. The pens of the following owners are suffering from warts:—J. H. Gill, Cowan Brothers (White Leghorns), and W. Lindus; while a few birds in various pens have broken into moult. The birds must have brought the warts with them, as none of the College stock had been affected, and we took the precaution to thoroughly disinfect all the houses before putting in the new competitors. Mrs. Jobling's Black Orpingtons (?) win the monthly prize with 123 eggs. The following are the individual records:—

Competitors.	Breed.	April.
Mrs. J. Jobling, Plattsburg, N.S.W.	White Leghorns (?) ...	123
Jas. McKay, Gatton	Do.	122
S. E. Sharpe, Childers	Do.	120
C. B. Bertelsmaier, Clare, S.A.	Do.	117
J. D. Nicholson, Flora st, Arncliffe, N.S.W. ...	Do.	102
W. Parker, Sunnybank	Do.	100
T. Fanning, Ashgrove, Brisbane	Do.	97
O.K. Poultry Yards, Fredericks st., Toowoomba	Do.	95
A. T. Coomber, Brown's Estate, Bundaberg ...	Do.	87
J. R. Wilson, Eudlo	Do.	85
J. Gosley, Childers	Do.	83
Dunheved Poultry Farm, St. Mary's, N.S.W. ...	Do.	82
Mrs. Munro, Sunnyside, Warwick	Do.	82
A. H. Padman, Pirie, st., Adelaide, S.A.... ...	Do.	81
C. T. Clark, Kenwyn st., Red Hill	Do.	80
E. A. Smith, Hawthorne st., Paddington... ...	Do.	80
R. Jobling, Brookstown, Wallsend, N.S.W. ...	S. L. Wyandottes ...	71
C. Knoblauch, Hawthorne st., South Brisbane ...	White Leghorns ...	68
J. M. Manson, care of Brabant and Co., Brisbane	Black Orpingtons ...	66
A. W. Bailey, Kenwyn st., Red Hill	White Leghorns ...	66
H. Harnill, Kogarah Bay, Kogarah, N.S.W. ...	Do.	61
J. M. Manson, care of Brabant and Co., Brisbane	Do.	61
R. Jobling, Brookstown, Wallsend, N.S.W. ...	Do.	57
Moritz Bros., Kalangadoo, S.A.	Do.	56
W. Purvis, Granville Beach, Port Adelaide, S.A.	Do.	55
W. Lyell, Graceville Avenue, Graceville... ...	Do.	54
T. Fanning, Ashgrove, Brisbane	Black Orpingtons ...	54
Cowan Bros., Acton st., Croydon North, N.S.W.	White Leghorns ...	53
J. Zahl, Boonah	Do. (No. 2)	53
P. Clayton, Blacktown, N.S.W.	Do.	50
Derrylin Poultry Farm, Mutdapilly	Do.	49
E. F. Dennis, Herston road, Kelvin Grove ...	Do.	48
E. V. Bennett, Kalangadoo, S.A.	Do.	48
J. H. Gill, Moorabbin road, Cheltenham, Victoria	Do.	44
Kelvin Poultry Farm, Kelvin Grove	Do.	43

Competitors.	Breed.	April.
W. Meneely, Freestone Creek, Warwick	Black Orpingtons ...	30
R. Burns, Sladevale, Warwick	Do.	37
J. Zahl, Boonah	White Leghorns (No. 1)	34
Geo. Tomlinson, Boonah	Do.	33
E. Pocock, Palmer street, Windsor	Do.	31
G. H. Turner, Aratula, Fassifern	Do.	30
Loloma Poultry Farm, Rockdale, N.S.W. ...	Rhode Island Reds ...	26
E. A. Smith, Hawthorne st., Paddington... ...	Black Orpingtons ...	23
E. Le Breton, McNab st., Milton	White Leghorns ...	22
J. Aitcheson, Oxford st., Paddington	Do.	18
Cowan Bros., Acton st., Croydon North, N.S.W.	Black Orpingtons ...	17
W. H. Forsyth, Willoughby, N.S.W.	White Leghorns ...	15
J. G. Richter, Aratula, Fassifern	Do.	8
W. Lindus, Main st., Cessnock, N.S.W.	Do.	6
R. Burns, Sladevale, Warwick	S. L. Wyandottes ...	4
F. Clayton, Blacktown, N.S.W.	Rhode Island Reds ...	0
J. R. Johnston, Junction Estate, Warwick ...	Plymouth Rocks ...	0
S. Chapman, Murphy's Creek	Brown Leghorns ...	0
Totals	...	3,936

FINAL REPORT, EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, 1914-15.

Our eleventh egg-laying competition was brought to a close on 31st March, 1915. Forty-two entries had been received, but two withdrew, leaving forty competing pens. These were made up as follows:—White Leghorns, 32 pens; Black Orpingtons, 4 pens; Brown Leghorns, 2 pens; and 1 pen each of Silver-laced Wyandottes and Rhode Island Reds, making a total of 240 competing birds. The number of eggs laid during the twelve months was 54,202, an average of 1,355 per pen, or nearly 226 per bird, constituting a new world's record. The birds were a splendid lot of layers, for although many of them had a bad start, owing to chicken-pox and moulting, they performed well when once they commenced to lay, there being only four pens that did not reach the 1,200 eggs; these four were, moreover, very unlucky at the start, while one (J. Murchie's) contained only five hens during the last three and a-half months. It may be mentioned also that the pens owned by J. D. Nicholson, Mrs. Bradburne, J. N. Waugh, and R. Jobling were returned on the morning of 28th March, thus losing three days of the twelve months.

The total value of the eggs laid was £248 10s. 1d., while the cost of food was £84 16s. 8d., leaving a profit, exclusive of labour, of £163 13s. 5d. over the cost of feeding. This profit is less than last year's, owing to the higher price of wheat, and it would have been still further reduced if we had not been fortunate enough to have the bran and pollard supplied under an old contract which only expired at the end of February last.

Nineteen birds died during the year. This is the largest percentage of deaths we have yet had in our competition, due largely to chicken-pox and the after effects thereof, one of which was indigestion, while four died from a growth in the throat.

As in previous years, strict attention has been paid to the feeding. For the benefit of beginners, it is proposed to go a little more fully into this question than has formerly been the case. Many people want to know exactly how much we feed; so, although it is impossible to lay down any hard-and-fast rules, we are giving the average. It must, however, be distinctly understood that the quantities given must not be fed every day in the year. Birds when not laying eat far less than they do when laying heavily, hence the feeder must find out just what is required at certain times. For instance, the quantity of wheat is given as six handfuls, one to each bird, but sometimes they will only eat five, whilst at others the same six birds will eat seven handfuls. For the morning meal the following were mixed together:—14 lb. pollard, 9½ lb. bran, 1½ lb. sunlight oilcake, and 1¼ lb. desiccated meat. The above were all weighed dry, making about 1¾ oz. for each bird, before having the water added. This quantity fed 240 birds. At mid-day they were given chaffed green lucerne, a good handful for six birds, also, once or twice a week, the same quantity of soup meat. The evening meal consisted of about 12 oz. of wheat per pen, or 2 oz. per bird average, the latter being fed about 5 o'clock. Oats and peas were fed on Sunday mornings and holidays, when bran and pollard were omitted. Fresh clean water was given every morning, while shell grit was at all times available. Two hundred and sixteen birds were broody during the competition period.

The following amounts were won as prize money:—

	£	s.	d.
A. T. Coomber, Brown's Estate, Bundaberg	7	17	0
Moritz Bros., Kalangadoo, S.A.	4	14	0
Loloma Poultry Farm, Rockdale, N.S.W.	2	12	0
T. Fanning, The Gap, Ashgrove, Brisbane	2	3	4
J. T. Coates, Harveston, Rockhampton	0	10	0
Cowan Bros., Acton street, Croydon N., N.S.W.	0	3	4
Derryling Poultry Farm, Mutdapilly, Harrisville	0	10	0
E. V. Bennett, Kalangadoo, S.A.	0	10	0
J. E. Bradley, Marville Poultry Farm, Moorabbin, V.	0	10	0
R. Burns, Sladevale, *viâ* Warwick	0	3	4
Total prize money	£19	13	0

The following are the details of eggs laid each month, also balance-sheet of the competition:—

Competitors.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Grand Totals.
A. T. Coomber, Bundaberg	White Leghorns	110	107	100	111	143	162	158	154	152	131	122	95	1,545
Moritz Bros., Kalangadoo, S.A.	Do.	58	50	118	142	152	157	152	163	160	154	128	110	1,544
Loloma Poultry Farm, Rockdale, N.S.W.	Do.	53	93	100	115	154	154	157	169	154	149	119	117	1,534
T. Fanning, Ashgrove, Brisbane	Do.	98	114	132	132	134	144	142	145	131	115	104	97	1,488
G. Tomlinson, Boonah	Do.	19	48	119	137	159	158	158	150	154	136	130	110	1,478
Marville Poultry Farm, Moorabbin, Victoria	Do.	27	39	91	102	148	156	160	161	148	153	140	131	1,456
R. Burns, Sladevale, Warwick	Black Orpingtons (No. 1)	17	47	115	151	162	163	146	132	142	130	115	129	1,449
A. H. Padman, Adelaide, S.A.	White Leghorns	44	27	72	123	159	159	159	159	141	149	128	127	1,447
Mrs. Munro, Sunnyside, Warwick	Do.	57	21	69	116	153	152	160	165	154	141	126	129	1,443
T. Fanning, Ashgrove, Brisbane	Black Orpingtons	0	8	84	157	165	163	150	157	141	143	132	141	1,441
Cowan Bros., Burwood, N.S.W.	White Leghorns	44	74	82	112	154	163	159	150	146	137	109	110	1,440
E. Le Breton, Milton, Brisbane	Do.	21	32	95	137	160	159	161	187	147	137	109	131	1,426
A. F. Camkin, Kogarah, N.S.W.	Do.	21	67	92	117	145	156	153	158	152	141	117	103	1,422
E. V. Bennett, Kalangadoo, S.A.	Do.	19	25	87	140	151	151	147	134	146	158	131	127	1,416
Derrylin Poultry Farm, Mutdapilly	Do.	29	22	87	120	144	153	163	150	152	138	129	129	1,416
F. McCauley, Maryborough	Do.	36	18	81	123	142	153	154	149	142	142	128	112	1,380
R. Burns, Sladevale, Warwick	Silver Laced Wyandottes	4	38	111	147	162	153	148	129	130	122	117	118	1,379
Loloma Poultry Farm, N.S.W.	Rhode Island Reds	40	87	106	126	152	153	156	130	131	124	97	71	1,373
R. Burns, Sladevale, Warwick	Black Orpingtons (No. 2)	17	27	102	139	153	158	147	141	138	136	106	108	1,372
J. T. Coates, Harveston, Rockhampton	White Leghorns	45	21	80	124	141	156	147	147	137	139	123	98	1,358
Mrs. Bieber, Childers	Brown Leghorns	75	57	73	92	142	151	152	148	135	132	111	84	1,352
J. R. Wilson, Eudlo	White Leghorns	55	47	110	136	124	141	126	145	133	115	102	116	1,350
J. Franklin, Red Hill, Coolabunia	Do.	18	31	92	126	155	150	147	153	139	122	111	105	1,348
J. Zahl, Boonah	Do.	46	16	48	123	140	138	143	147	141	145	129	125	1,344
Kelvin Poultry Farm, Brisbane	Do.	84	108	117	133	141	128	131	123	128	104	93	44	1,334
J. M. Manson, Brabant and Co., Brisbane	Do. (No. 1)	19	67	79	110	139	144	140	141	141	136	106	103	1,326
J. T. Coates, Harveston, Rockhampton	Black Orpingtons	23	67	133	119	142	149	135	129	114	110	104	94	1,319
Range Poultry Farm, Toowoomba	White Leghorns	58	19	24	126	148	147	148	140	142	128	118	119	1,317
C. E. Austin, Boonah	Do.	77	53	77	101	132	133	138	139	140	121	108	95	1,314
J. Kilroe, Brisbane	Do. (No. 2)	72	30	49	107	134	144	145	151	136	137	105	88	1,298
D. Moreton, Coraki, N.S.W.	Do.	15	24	88	121	140	141	138	140	135	131	98	91	1,262
J. D. Nicholson, Arncliffe, N.S.W.	Do.	29	53	100	119	131	132	135	121	125	118	94	83	1,240
J. N. Waugh, Bankstown, N.S.W.	Do.	17	49	96	78	125	130	139	133	125	135	119	94	1,240
Mrs. Bradburne, Kogarah, N.S.W.	Do.	40	32	54	111	135	148	151	139	120	105	110	82	1,227
J. Gosley, Childers	Do.	60	52	80	111	135	146	132	136	114	121	82	46	1,215
R. Jobling, Wallsend, N.S.W.	Do.	67	42	88	104	140	139	138	136	134	109	72	36	1,205
J. Murchie, Childers	Brown Leghorns	31	16	31	101	139	146	149	140	140	124	107	72	1,196
J. Kilroe, Brisbane	White Leghorns (No. 1)	54	31	89	112	119	131	128	125	123	106	96	80	1,194
J. M. Manson, Brisbane	Do. (No. 2)	9	42	66	73	128	149	140	135	129	130	93	71	1,165
C. M. Jones, Rockhampton	Do.	29	39	35	95	144	151	147	147	134	105	79	44	1,149
	Totals	1,637	1,840	3,452	4,769	5,766	5,961	5,879	5,748	5,529	5,209	4,447	3,965	54,202

BALANCE-SHEET.

Receipts.

	£ s. d.	£ s. d.
Entry fees, 42 at 10s.	..	21 0 0
Sales—		
Orient Co., 1,299 doz. eggs	75 15 6	
College dining-hall, 2,479 10/12 doz.	132 9 7	
Barnes and Co., net returns, 738 doz.	40 5 0	
		248 10 1
Total receipts	..	£269 10 1

Expenditure.

	£ s. d.	£ s. d.
Feed—		
Wheat, 186 bus.	51 6 8	
Oats, 15 bus.	5 9 3	
Peas, 6 bus.	1 15 6	
Bran, 140 bus.	7 0 0	
Pollard, 210 bus.	10 10 0	
Oilcake, 4 cwt.	2 7 9	
Bone, 1 cwt. 1 qr. 20 lb.	1 2 10	
Desiccated meat, 3½ cwt.	3 4 8	
Green lucerne	1 10 0	
Soup meat	0 10 0	
		84 16 8
Deduction by Orient Co., account broken eggs	..	0 7 0
Legbands	..	0 16 9
Prize money	..	19 13 0
Net profit on competition	..	163 16 8
Total expenditure	..	£269 10 1

P. M. PITT, for Principal.

CHOKING.

Cases of choking are frequently heard of, have occurred to our own knowledge in Brisbane, and once in our own case at Texas. In this latter case fortunately a doctor was at the dinner table and relieved us of the trouble. The "Journal of the Jamaica Agricultural Society" writes on this subject:—

"It is seldom that people know what to do in such cases, in the absence of a skilled physician; yet relief may be surely and quickly obtained by pouring the white of an egg (raw) down the sufferer's throat. This remedy never fails because the egg will slip down the throat and render the obstruction so smooth that it will readily pass on down. This remedy is just as effective for animals as for human beings. To administer the dose to an animal, however, is not always easy. The correct way is to place the white of the eggs in a bottle, raise the animal's head, thrust the bottle well back, and empty."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF APRIL, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady May ...	Ayrshire	7 Mar., 1915	823	3·6	34·68	In addition to pasture on natural grasses, the dairy cows received a ration of ensilage.
Thornton's Fairetta	Jersey	27 Mar. ,,	566	4·9	32·70	
Miss Melba...	Holstein	6 Mar., 1914	724	3·6	30·51	
Iron Plate ...	Jersey	21 Feb., 1915	481	5·1	28·95	
Madame Melba	Holstein	8 Sept., 1914	596	4·0	27·98	
Honeycomb	Shorthorn ...	27 July ,,	481	5·4	26·98	
Lady Melba	Holstein	6 Mar. ,,	535	4·2	26·40	
Nina ...	Shorthorn ...	18 Feb., 1915	638	3·5	26·10	
Bella ...	Ayrshire	19 Jan. ,,	578	3·8	25·73	
Miss Jean ...	,, ...	24 Jan., 1914	459	4·7	25·42	
Cocoatina ...	Jersey	6 Mar., 1915	493	4·3	24·94	
Miss Lark ...	Ayrshire	31 Oct., 1914	428	4·8	24·22	
Sweet Meadows	Jersey	28 July ,,	330	6·2	24·22	
Burton's Lily	Shorthorn ...	17 Nov. ,,	488	4·2	24·09	
Simple Interest	Jersey	24 Nov. ,,	440	4·6	23·84	
Nellie II. ...	Shorthorn... ...	20 July ,,	570	3·6	23·79	
Glen ...	,, ...	20 Oct. ,,	453	4·4	23·46	
Lady Loch II.	Ayrshire	8 Feb., 1915	470	4·2	23·19	
Butter ...	Shorthorn... ...	20 Nov., 1914	514	3·8	22·89	
Lady's Maid	,, ...	2 Feb., 1915	472	4·1	22·72	
Lady Margaret	Ayrshire	19 June, 1914	384	5·0	22·65	
Lady Annette	,, ...	26 Dec. ,,	417	4·6	22·60	
Miss Bell ...	Jersey	3 Aug. ,,	318	6·0	22·57	
Violette's Peer's Girl	,, ...	22 Oct. ,,	378	5·0	22·30	
Rosebud II.	Ayrshire	20 Sept. ,,	375	5·0	22·12	
Silver Nell...	Shorthorn ...	5 Oct. ,,	369	5·0	21·77	
Pauline ...	,, ...	12 Oct. ,,	363	4·9	20·97	
Lowla II. ...	Shorth'rn-Ayrshire	23 Sept. ,,	442	4·0	20·74	
Countess of Brunswick	Shorthorn ...	27 July ,,	391	4·5	20·72	
Lady Dorset	Ayrshire	20 Sept. ,,	394	4·4	20·40	
Special Edition	Jersey	19 Dec. ,,	345	5·0	20·35	
La Hurette Hope	,, ...	21 Aug. ,,	316	5·4	20·16	
Dolly ...	Shorthorn... ...	19 Dec. ,,	478	3·6	20·14	
Auntie's Lass	Ayrshire	16 Feb., 1915	504	3·4	20·2	

State Farms.

BUNGEWORGORAI—REPORT FOR MONTH ENDING 31ST MARCH.

Meteorological.—Dry conditions prevail, and are at present acute, as during the last three months only 60 points have been recorded, whilst the total precipitation during the last eight months only totals 654 points. The maximum temperature recorded was 104 degrees—average, 92·0 degrees. The minimum temperature recorded was 56 degrees—average, 67·8 degrees. Rainfall, nil.

Orchard.—The effects of the continued dry weather are very evident here, more especially in the citrus area, where a number of trees have been completely destroyed.

Vineyard.—Even in this department the effects of the absence of rain are very marked.

Farm.—Operations in connection with the preparation of land for the forthcoming winter cereal crop have been suspended for some considerable time, owing to condition of the ground preventing satisfactory work being accomplished.

Stock.—Horses and cattle look exceptionally well. All are being fed on silage, chaff, and grain, and have been for some time past. So far the lack of natural food in the paddocks has not occasioned any sickness amongst them.

Water.—A fair amount of the water required for the stock has to be pumped, owing to lack of sufficient wind and absence of surface water.

Paddocks.—The prickly-pear throughout the paddocks has been poisoned with an injector, fair results being obtained. Advantage has been taken of the dry spell to burn some of the fallen timber with which some of the paddocks are littered, and will be continued with as other work permits.

Three lots of farmers' wheats have been graded. Samples submitted were extremely dirty, being infested with oats, barley, chaff, &c.; but the machine did splendid work, the growers being more than satisfied.

NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, APRIL, 1915.

Meteorological.—Rainfall, 3·52 inches.

Days on which rain fell, 11.

Maximum temperature, 90·5 degrees on the 12th.

Minimum temperature, 63 degrees on four days.

Rainfall since 1st January, 1915, 15·52 inches, being only half of the previous minimum rainfall (1897) for the same four months. While

no rain fell during the first half of the month, in the latter half we were blessed with nice steady soaking showers, and advantage was taken to plant out many seedlings into Nursery beds.

Coffee.—Pickings have already started; that for young trees—which are the most forward—has been cleaned as parchment, while the small pickings from the older trees have been prepared for seed.

Vanilla.—For a time it looked as though this crop was going to suffer badly, owing to continued dry weather; but with the rain the vines have picked up and show a good healthy colour.

Bananas appeared to suffer less than anything else from the shortage of rain—that is, where cultivation had been carried on—and the fruit has been very free from attacks of fruit fly.

A POSSIBLE QUEENSLAND INDUSTRY—COTTON SEED OIL AND CAKE.

We have for many years advocated the growing of cotton by farmers on small areas, and have especially laid stress on the value of the crop in a dry season such as we are now experiencing, owing to its drought-resisting capabilities. When few other crops survive a protracted dry season, cotton continues to grow and to produce its crop. We have never yet seen a cotton field destroyed by drought. During the long drought of 1902, we saw cotton plants in full bearing in the Western country. The fibre is not the only valuable portion of the crop. The seeds contain a valuable edible oil, which, it is said, is often sold as olive oil. When the oil is expressed, there still remains the oil cake, which, as all dairymen know, forms an excellent food for stock.

In the far North, near Cairns, we find the only progressive cotton company in the State. This is the Gossypium Park Company, whence many hundreds of bales of cotton have been shipped during the past few years. A paragraph in the "Cairns Post" informs us the the company has now added the manufacture of cotton-seed oil and cake to its activities. The "Post" says:—

"We have had forwarded from Gossypium Park Estate a sample of crude oil extracted from cotton seed by an hydraulic pressure of 85 tons. This oil Mr. Campbell is placing on the local market for culinary purposes in the preparation of fish and other dishes, while the cake is finding a ready sale among stock fatteners in the country districts. It will probably come very largely into use in place of the cake hitherto used, as it can be supplied at 12s. 6d. per cwt., as against 14s. per cwt. in the case of the other, and Mr. Campbell guarantees it to be 25 per cent. richer. In the ordinary cake all the oil is extracted except some 5 or 10 per cent., but at Gossypium Park 45 per cent. of the oil is left, to the great improvement of the cake, of which only 4 lb. per diem per head is required for fattening stock.

The Orchard.

BANANA CULTIVATION—PRUNING AND TREATMENT OF SUCKERS.

By R. G. BARTLETT, Buderim.

In Jamaica a great deal of attention is given to this subject in order to produce fruit when the market demand is keenest and prices therefore highest.

Queensland growers know the great difference in prices obtaining in January and February compared with those of May to September or October. The returns from plantations would be very materially increased if we could regulate our fields to throw bunches in, say, March or April. These bunches are always large and they mature during the months of good prices.

It has been the practice on the school plot to carry out the main pruning in February and March. At that time a fair-sized "follower" is left to each of the three main suckers forming the stool. During the rest of the year the small "peepers" (suckers) are pruned out as they appear. The result has been that 66 per cent. of the total crop has been harvested in the six months, June to December. Actual figures are 54 bunches for six months, January to June, and 103 bunches from July to December. Out of the total 157 bunches only 24 bunches were harvested in January and February—months of wet weather and exceedingly low prices.

Of course it will require careful testing before conclusive results are obtained to show which is the best month or months to allow "followers" to go ahead in order to gain the desired end—*i.e.*, majority of bunches harvested during time of best prices. In this connection, the views of your readers who have considered this matter would be valuable if you could spare space in your Journal for the discussion of this subject.

THE SEX OF PAWPAW PLANTS.

Mr. Ernest C. Davies, Charters Towers, writes:—

"Mr. C. Ross, in your May number, tells 'A.H.F., Diddillibah,' that there is no way to tell sex in young papaw plants. Here's an idea that is advocated by Mr. Geo. Johnson, Curator of Lissner Park, Charters Towers. I have tried it repeatedly with marked success. To get females, plant only about 5 per cent. of your seedlings, choosing the very smallest and sickliest-looking plants. Destroy all the big strong fellows. Watch for the plants that come up after the main lot have germinated; they are often females. The idea is taken from the general rule of Nature, that the female is mostly weaker and smaller in infancy. Watch a litter of puppies or a batch of chickens, for instance. Of course, the rule is not absolutely certain, for there is often a sickly male in every part of Nature, and, *vice versa*, an extra sturdy female; but I get over 80 per cent. of female papaws in this way, and I recently scored twenty-four out of twenty-five plants."

A FINE BUNCH OF BANANAS.

The accompanying illustration shows a magnificent bunch of bananas grown by Mr. W. Power on his farm in the parish of Goomboorian, about 11 miles from Gympie.

The bunch originally consisted of 307 fruits, and was part of a first crop grown on virgin scrub land. The season had been very

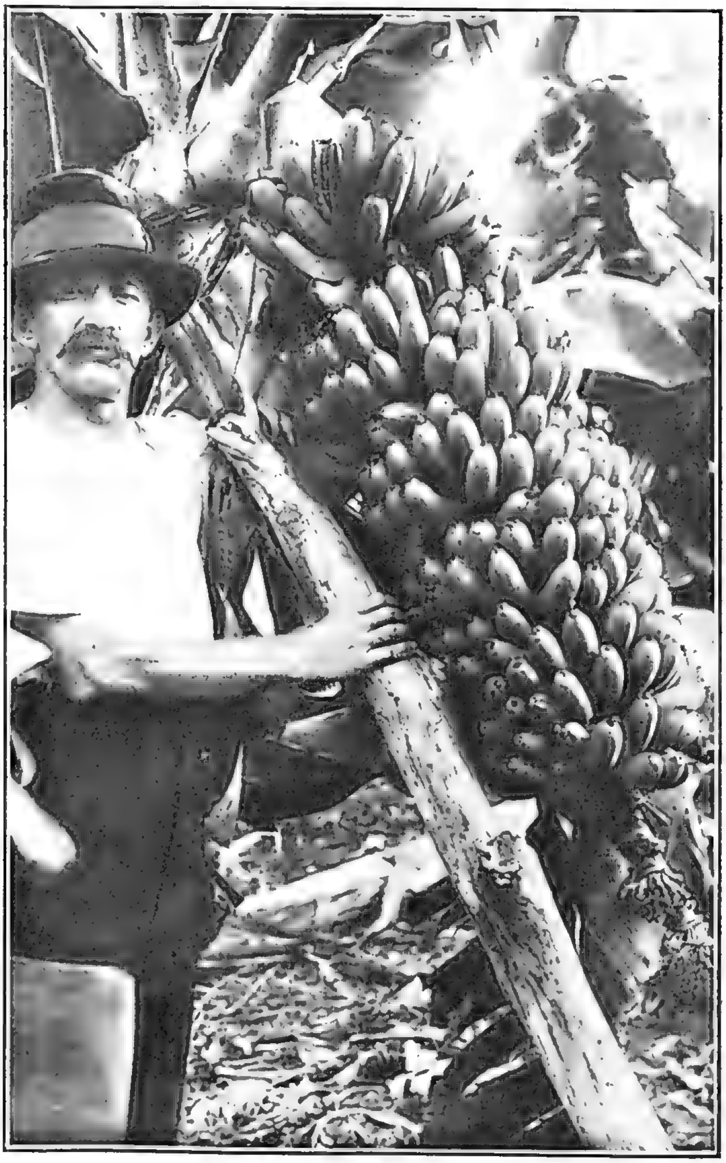


PLATE 25.—BANANAS GROWN BY MR. W. POWER, GOOMBOORIAN.

unfavourable, no rain having fallen since Christmas. Mr. Power says there is a very large scope of country in Goomboorian still standing scrub—equal or superior to the country on which this bunch was grown. The drawback to the country is want of good roads.

Tropical Industries.

NOTES ON VANILLA CULTURE.

BY HOWARD NEWPORT, Instructor in Tropical Agriculture, Cairns.

PLANTING.

The planting up of the vanilla demonstration plot at Babinda was carried out during the first week in February. The plot is situated in the Babinda Valley, about 3 miles from the railway station of that name. This valley runs between the two highest mountains of North Queensland (and second highest in Australia), Bellenden Ker on the north and Bartle Frere on the south, and is an offshoot of one of the finest valleys of agricultural land to be found anywhere in the world. This grand valley runs for some 100 miles more or less parallel with the coast, and is watered by a series of rivers, commencing with the Mulgrave and including the Russell, North Johnstone, South Johnstone, Moresby; Liverpool and Maria Creeks (really rivers, having direct outlet to the sea); the Hull, Tully, Murray, &c., and by innumerable creeks, many of them as big and important as rivers, tributary to these rivers. The valley is of varying width, from 2 to 5 or more miles, and has a range of foothill between it and the sea on the eastern side protecting it from unduly strong sea gales, with a higher range on the western side high enough to attract and insure a regular and sufficient rainfall. The land is fairly flat, excellently watered, richly timbered, and affords some of the finest agricultural land to be found in the State. At Nelson, Babinda, Goondi, and the South Johnstone, sugar mills are situated and cane is found to grow to perfection, as will almost any tropical staple; while for vanilla, owing to its natural protection from gales, its humidity, and the straight and uniform growth of timber, it presents conditions unique in their eminent suitability for the staple and such as are to be found hardly anywhere else in the world.

In this valley, and on a small flat of sandy loam of a sedentary basaltic origin, on the bank of a permanent creek of clear, cool, sparkling water, a tributary of Babinda Creek (itself really a river, but emptying into the Russell some 10 miles from its mouth), is situated the Government demonstration plot of vanilla.

The land is portion of a farm belonging to Dr. J. H. Reed, of Cairns, who has entered into an agreement with the Department of Agriculture and Stock, in consideration of the Department supplying plants, and, through its officers, the requisite knowledge and experience, at his own expense, to carry out all the work required in cultivating and bringing the plantation to fruition, and in harvesting, curing, and marketing the crop for a term of years.

The planting up of the plot occasioned some interest. The first remark of visitors generally was, "Ah! I see you are opening an experimental plot." On my replying that it was not an experimental plot

but a demonstration plot, they said, " Well, what's the difference?" The difference is just this—An experimental plot necessitates every few plants being treated differently for some object or other, and involves a certain amount of dead, unprofitable, or negative work, and also implies some uncertainty as to results, whereas in vanilla the experimental work has been done at the Kamerunga State Nursery in past years, and in these demonstration plots it is not proposed to experiment or to do any unprofitable work, but to demonstrate on a commercial scale the feasibility of the practical culture of the staple in hand.

The Babinda vanilla plot is an acre in extent; this may sound small, but for so high priced a commodity, and for the purpose, it is sufficient.

The cuttings necessary for planting up were obtained from the experimental plot known as the old vanillary at the Kamerunga State Nursery.

In taking cuttings, the vines that had been allowed to run up the trees especially for the purpose were taken where possible. These were strong and straight, but other parts of the vines cut could not be discarded merely because they had grown crooked or bent. A considerable proportion were strong, straight cuttings, and all were good healthy specimens, 2½ to 3 ft. long, averaging six to ten eyes or nodes. The vanilla being soft-bodied, the fear in transport is bruising on the one hand and drying or withering on the other. The more leaves on the cuttings, therefore, the more recourses they have for moisture, hence they travel best without trimming. On unpacking, the first work, therefore, was to trim them, which was done with a small pair of secateurs. Each cutting was taken up and examined, and was first topped and tailed—*i.e.*, any portion of the stem that had been left on more than half an inch or so above or below the last eye or node at each end was cut back to that length. This was with cuttings that had been cut at both ends, as most of them were. Those having a growing tip at one end only required tailing, of course, unless the tip had been damaged by being crushed or broken. Tip cuttings, generally speaking, are better than those cut at both ends and come away quicker, but are more delicate and do not survive a long or rough journey half so well as ordinary cuttings. For planting near the source of supply tip cuttings are preferable, if obtainable, but the proportion in an ordinary consignment is naturally small, for a length of vine of 20 to 30 ft. divided into cuttings will afford ten to twelve ordinary ones with, normally, only one tip cutting. Branch shoots and shorter vines supply a larger proportion, but no consignment could be made up consisting purely of tip cuttings.

After topping and tailing, the base end which is to be put in the ground has to be relieved of its leaves. It is not always easy at first glance to tell which is the base end, for the leaves do not always incline upwards. When taken from a vine that has been looped over supports the leaves may be at right angles, be inclined downwards, or even twisted right round. No mistakes can be made if it is borne in mind that

the bud is always in the axil of and *above* the base of the leaf, which protects it. While sitting in the shade of the clearing with a crate of cuttings before one, the trimming, easy as it is, requires a little attention to business to prevent mistakes being made with the knife or secateurs that cannot be remedied. Roughly, one-third of the length of the cutting has to go below ground and two-thirds above against the supports. While the cuttings are usually made fairly uniform in length, the length of the nodes differs materially—a 2 ft. 6 in. cutting may have six to ten eyes. In a six-eyed cutting three, and in an eight to ten eyed cutting four leaves are removed. This is done by clipping the petiole or stalk of the leaf as near the stem as possible without damaging the bud, and has been found advisable in expediting root growth. Cuttings planted with the leaves adhering to the portion underground will not necessarily die, but they have been found to rely for an unduly long time on the sap in the fleshy leaves without making roots, and the ultimate rotting of the leaves may extend to the stem to which it is still attached. The portion aboveground, on the other hand, needs all the nutriment it can obtain from, and per medium of, the leaves, which in no way interfere with but rather encourage the growth of tendrils, adventitious roots, and new shoots, by protecting the eyes, &c. Similarly to the portion below ground, it does not necessarily mean that in the absence of leaves the cutting is doomed. It may still thrive, though it has been found more advantageous for the portions covered to be leafless, while they are retained on the visible portion when planted.

The next operation is the removal of all tendrils or adventitious roots or rootlets from all parts of the cutting, whether new and fresh or old and dry, which is done in a similar manner to the leaves on the basal portion. It has been found that once a tendril or adventitious rootlet has been separated from anything to which it has been attached it very seldom grows again, generally dying off and new ones making their appearance. The presence of the old tendrils, &c., even if fresh looking, only hinders the production by the plant of new ones, while their neat removal materially encourages new growth of this nature. The appearance of tendrils is the first sign of activity the plant makes, and they serve to anchor the vine to its support and hold it in place for the growth that will follow. These sucker-like tendrils are what are first looked for by the planter as evidence of vitality and development in the newly planted clearing.

After topping and tailing, removing the requisite number of leaves and all tendrils or adventitious roots, the cuttings are ready to plant out. In carrying them to the different parts of the clearing care must be taken, for the 2½ to 3 ft. length of soft vine is quite heavy enough, if only a dozen or two are taken carelessly or by one hand, to cause the lower ones to fold or break. Once thus broken very seldom will any growth be made above the break, and if so broken a cutting has much better chance if subdivided at any such break and planted separately. This calls to mind the experience of one grower who, on having been supplied with 200 2 ft. 6 in. cuttings, promptly proceeded to double the number by cutting them in half, and was subsequently

disappointed at the amount of growth compared with other planters. Such subdivision would seem all right and might work with many other plants, but with vanilla the growth is largely in ratio to the length of cutting used. Cuttings longer than 5 or 6 ft. have not been experimented with certainly, being too cumbersome and extravagant when plants are at a premium; but it has been amply demonstrated that up to that length the longer the cutting the quicker the growth, and *vice versâ*.

A young vine with 6 ft. of growth, if the upper half be taken for a cutting and planted adjacent to it, is thrown back so as to be no nearer advanced to maturity and crop-bearing than its progeny. Hence taking cuttings from a new plantation of, say, a year old, while enabling the area to be increased, retards the bearing of the original planting by just that period; and reducing the cuttings to less than 2½ ft. (which has been found here the most satisfactory size, in view of the limited quantity of stock plants and a reasonable time of coming into bearing) only reduces the rate of development proportionately.

The next process, the actual planting of the cuttings, is a comparatively simple matter and quickly done. The pitting merely consists of loosening the ground to a depth of a few inches—4 or 5 is ample—and removing roots or stones that may be met with. The point is to get the plant in the most advantageous position. If the clearing has been properly brushed, the side of the tree against which the cutting is put does not matter very much. If convenient, it should be on the leeward side from the prevailing wind and on the shady side. Vanilla grows quickest in the comparatively more shaded parts and bears best in the comparatively lighter parts, but the vine can be trained later into the best position, which matter will be dealt with when that work is being done on the demonstration plot.

It is best to carry a trowel or some such implement with one when planting, and also to have a mattock handy. Sometimes the spot decided on is found to have big roots just below the surface, and as the vanilla must be planted *close* to the trunk of its living support it is not allowable to go further off, so another spot must be selected further round the tree. The soil is loosened but not taken out, to a width of, say, 3 or 4 in., and of sufficient length to take the cutting—generally 12 to 15 in. at most. When loosened, the part of the cutting from which the leaves have been removed is laid not more than 2 in. below the surface, and the soil firmed down by hand, the larger portion of the cutting with its leaves intact is gently bent so as to lean vertically against, and close to, the tree. It is best to complete the planting as quickly as possible, to prevent any possibility of the cuttings wilting unduly, and then to come back for the next operation of tying.

For tying, a soft sort of rather thick, tarred twine known as "marlin" has been found the best, but anything that is not thin and hard enough to cut the vines or rot away in the wet too quickly will do. In tying care must be taken to bend the cutting so that at least one, and as many eyes as possible, are actually in contact with the bark of the supporting tree, for from these eyes will the new tendrils grow and fasten themselves on. In round trees the marlin is passed right round

the tree and cutting and tied firmly, but not too tightly. Where a tree has flanges and encircling would not accomplish its purpose, nails are used, two being put in 6 in. or more apart on each side of the cutting, and the tie made from one to the other over the cutting. Generally it is best to plant one cutting to each tree 1 ft. or less in diameter, and two to trees larger than this. The actual number to an acre will be found to vary as the density of the scrub varies, and if trees are too far apart for rails or bars of 9 or 10 ft. to be conveniently fastened from one to another the number of vines that can be planted will be found less than 500, but this number is made up later by planting against the posts that will have to be put in to support the rails. In such cases it is best to plant a greater area and to wait till the first planting necessitates the erection of rails—a year or perhaps two years later, and then to get more plants to fill up. Five hundred is quite enough for an acre, though it would be quite easy to plant more.

The last process of planting is covering in—that is, covering with dead leaves the soil over the basal end of the planted cutting. This is to prevent drying and evaporation of the moisture as well as to supply plant food for the roots when they appear, and which is obtained largely from decaying leaf and vegetable matter. This may be done when planting the cuttings, but if left to the last serves also as an opportunity to have a final look round and see that all the other operations are correct, that none have been overlooked, and that all is ship-shape.

The clearing will be now under way and should require no more attention for some time. With reasonable weather growth may be expected in four to six weeks, which will become more and more rapid for a year. It is as well, of course, to see that undergrowth, or other ærides and epiphytes on the trees, do not interfere with the vanilla, but no further attention should be required until the operation of erecting the bars.

The principal cost, so far, will have been the plants themselves. The 520 for the Babinda demonstration plot, valued at 6d. each, amount to £13. The brushing took seven men in all, and was heavy on account of the necessity for cutting up heavy limbs of trees that had fallen in parts against the base of the trees. The planting took four men, making eleven men in all, who at 9s. 2d. (sugar rates) cost £5 0s. 10d. Freight on the crates of cuttings and return of empty crates amounted to 4s. 2d., and the marlin for tying (8 hanks) cost 12s., making a total of £18 17s.

CHICORY *(CICHORIUM INTYBUS)*.

Chicory, or succory, as it is sometimes called, is an herbaceous perennial plant belonging to the natural order Compositae. Its roots are strong and fleshy, penetrating to a considerable depth in loose open soil. The lower leaves resemble those of the well-known dandelion; the upper leaves are ovate (egg-shaped). The stems are alternately branched, from 2 to 6 feet high, and they become woody after the flowering period. The flowers, of which a great many are borne, are

arranged along the stems, two being usually placed close together, and are of a bright sky-blue colour, rarely white. The fruits are small, one seeded, angular nuts.

The plant is common in many parts of England on gravelly and chalky soil, in waste places, and along road-sides. It is grown in many parts of the continent of Europe, especially where small holdings are prevalent, as a forage crop, to be cut and consumed in a green state, or used for the grazing of sheep and cattle, which are very fond of it. The young leaves are often used like spinach, and in Europe the tender young roots are used as a vegetable, like carrots. The root of the chicory plant is of the order of the beet or salsify root. As a cultivated plant it has three distinct applications. Its roots, roasted and ground, are used as a substitute for, adulterant of, or addition to, coffee. Both roots and leaves are employed as salads, and the plant is grown as a fodder or herbage crop, which is greedily eaten by cattle.

The largest quantities of chicory were grown in Belgium and France previous to the great war of 1914. When grown for the sake of the root, the leaves should not be cut or pastured before harvesting. It is important to note that the leaves should not be fed to milch cows, as they make the milk bitter.

As a farm crop, its chief advantages are its adaptability to dry poor soils, its power of growing several large cuts of green food per annum when once established, its perennial character and easy cultivation. It is an exceedingly hardy crop.

SOIL PREPARATION.

Experience has shown (we learn from Messrs. Wilcox and Smith's "Farmers' Cyclopaedia of Agriculture") that chicory is adapted to any good loam soil that will produce good root crops, and that it will thrive wherever the sugar beet or mangolds do well.

Land for chicory should be deeply ploughed in the spring, be well harrowed, and worked down to pulverise all lumps and make it compact, and again harrowed just before the seed is sown, to kill all germinating weed seeds.

PLANTING.

The seed may be sown at any time in fine weather in the spring, in rows 18 to 24 inches apart if horse cultivation is intended, and from 12 to 24 inches apart if the crop is cultivated by hand. From 1 to 1½ lb. of seed is required per acre, but for use as a green crop from 10 to 12 lb. of seed are usually sown. The seed should not be covered more than three-quarters of an inch deep, and not more than one-half inch in heavy or wet soils.

CULTIVATION.

After the plants are up, they will need frequent shallow cultivation with some of the light cultivators made especially for sugar beets, to kill the weeds and preserve the soil moisture. When the plants have attained the height of 2 or 3 inches, they should be thinned out to stand from 4 to 6 inches apart. Only one plant should be left in a place.

HARVESTING.

If chicory is grown for forage, a crop of leaves can be cut in the autumn, and afterwards two or three crops per annum will be provided. It is best cut just when the flowering shoots are extended, and before they become woody and hard, or the field can be grazed at intervals instead. The plant usually lasts (as a forage plant) in a productive state for four or five years.

PLATE 26.—CHICORY ROOTS AND LEAVES.

In harvesting the root crop, a beet loosener may be run along the rows. This breaks the connection of the roots with the soil so that they can easily be lifted by hand. A less convenient way is to run a plough alongside the rows so as to expose the roots on one side. Special machinery has also been devised, and is procurable in the United States or in Europe (Holland, Belgium, Switzerland before the war) for

pulling the roots. After removal from the ground, the tops are cut off at the base of the bottom set of leaves. The roots should not be pulled until they are ripe, and this stage is indicated by the disappearance of the milk from the roots.

PLATE 27.—CHICORY PLANT IN BLOSSOM.

If it is desired to keep the roots some time before delivery to a factory, they may be stored out of doors in piles from 4 to 5 feet wide at the bottom, and covered lightly with straw and earth. The ridges of the piles should be left open for a few days to let the warm air escape. The yield varies from 5 to 10 tons of fresh roots per acre.

PREPARATION OF THE ROOTS.

For the preparation of chicory the older, stout, white roots are selected, and after washing they are sliced up and dried in a kiln. In our hot summer, however, the drying can be performed by spreading the sliced roots on a canvas framework, covering them at night to protect them from dew. In two or three days they are dry enough to bag. There are several varieties of chicory, but the sorts generally used for mixing with coffee are Magdeburg, Brunswick, and Elite, the last-mentioned variety being similar to the large-rooted Brussels or "White Loof" variety. The latter has a thick, stubby root and is the most profitable to grow for manufacture.

MARKETING.

The chicory-grower can either sell the dried, sliced roots or he may roast them in a revolving iron cylinder. The loss in weight by this process is from 20 to 30 per cent. During the roasting, 2 lb. of lard should be added to every hundredweight of chicory to give it a lustre like that of coffee. The ground chicory looks like ground coffee and smells like liquorice. There is a good market for it both in Brisbane and the Southern States, and now that the devastation caused by the war has practically put an end to the cultivation of many crops, such as beetroots, chicory, flax, and others—in Belgium and France—it would seem that there is a good opportunity for Queensland farmers to enter upon chicory cultivation, and afterwards retain a business which cannot but be profitable.

Before the above calamitous war overtook France and Belgium, the price of Belgian chicory was £7 5s. per ton, f.o.b. Antwerp; to-day Dutch chicory, f.o.b. Dutch ports, is quoted at £16 per ton for the dried roots. The wholesale price to retailers of manufactured (*i.e.*, roasted and ground) chicory was £27 per ton, whilst now it is £45, and the price still rising. Here is a good opening for Queensland farmers to seize upon this industry and hold it for the future.

As to the prices for the dried root, Messrs. Harper and Co. and Messrs. Thurlow and Co. are purchasers of good samples of dried and cured chicory roots, at prices which should enable the grower to make a good profit on his crop. The seed may be obtained in Brisbane, and we understand that the price is 3s. per lb.

CRUSHING DATES—1915 SEASON.

The "Queensland Sugar Journal" states that the following mills will commence crushing on or about the under-mentioned dates:—

Moreton—end of July.
Victoria—about end of June.
Kalamia—about first week in August.
Pleystowe—about August.
Nerang—early in August.
Maryborough—end of August.
Marburg—middle of August.
Baffle Creek—early in July.
Waterloo—early in August.
Marian—about last week in July.
Hambledon—about end of July.
Invicta—well into August or beginning of September.

THE LUCE CANE HARVESTER.

A little over a year ago (April, 1914) we published an account given in the "Louisiana Planter" of 6th December, 1913, of a cane harvester invented by Mr. George D. Luce, of New Orleans. About that time the machine was tried at the sugar experiment in Audubon Park on a crop estimated to yield 30 tons of cane per acre. The work done by this machine was so excellent as to "foreshadow the complete success of Mr. Luce along the lines which he has developed." At this trial

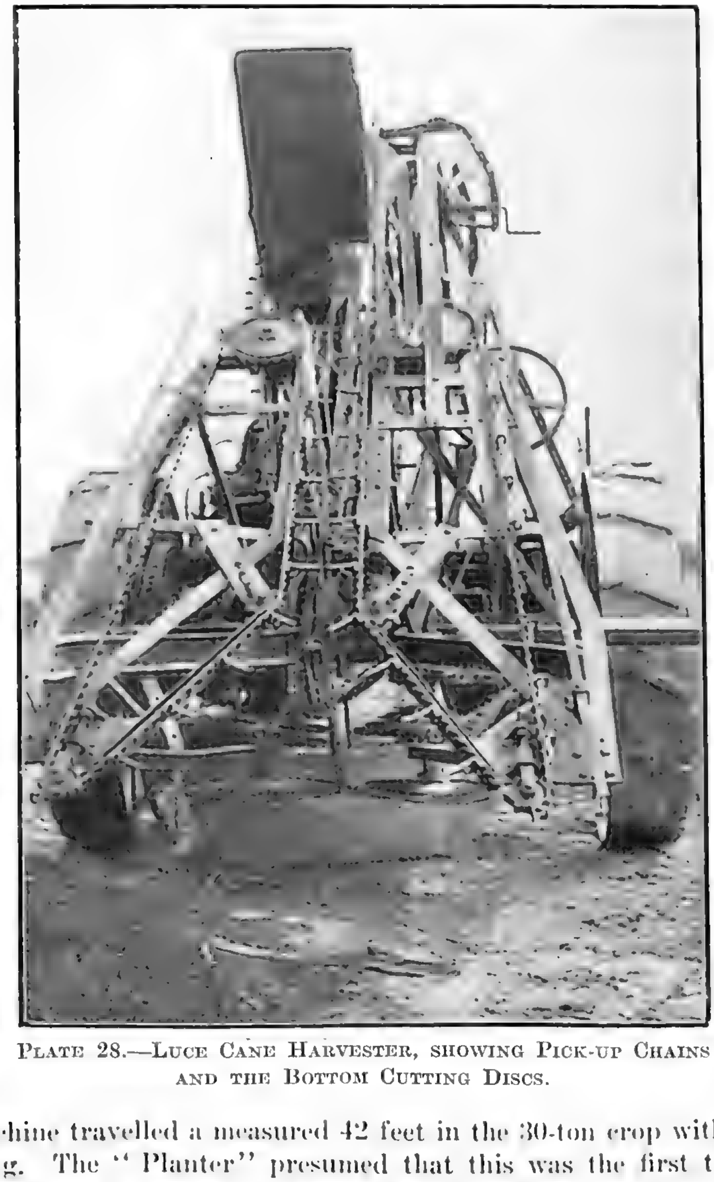


PLATE 28.—LUCE CANE HARVESTER, SHOWING PICK-UP CHAINS AND THE BOTTOM CUTTING DISCS.

the machine travelled a measured 42 feet in the 30-ton crop without any stopping. The "Planter" presumed that this was the first time that any sugar-cane harvester had accomplished that distance in heavy cane without a single stop. The machine is thus described in the above-named Journal:—

"Mr. Luce's machine weighs about 3¼ short tons. He believes that by gradual improvements this can be reduced to 1¾ short tons; but with

the weight of his present machine it made a surprising progress through the cane row.

" Mr. Luce has geared his cutting discs so that their movement makes sliding cuts on the cane, and not a direct, forcible cut, as is done with other disc machines. This may be one of the reasons of its successful traction in heavy cane.

" The cane where cut by the knives at the bottom is controlled by link belt chain guides that pick the cane up from close to the ground, as well as those that are standing vertically, and bring all of these canes in a vertical line to a point at which these guiding chains completely grasp the cane, holding it firmly in position. The stream of sugar-cane thus entering the machine enters at an angle established for the purpose, which, with some 5 or 6 feet of travel, carries the cane forward and upward until it strikes the top of the chute, when the firm grasp of the guide and feeding chains so hold the canes that the soft tops bend over,

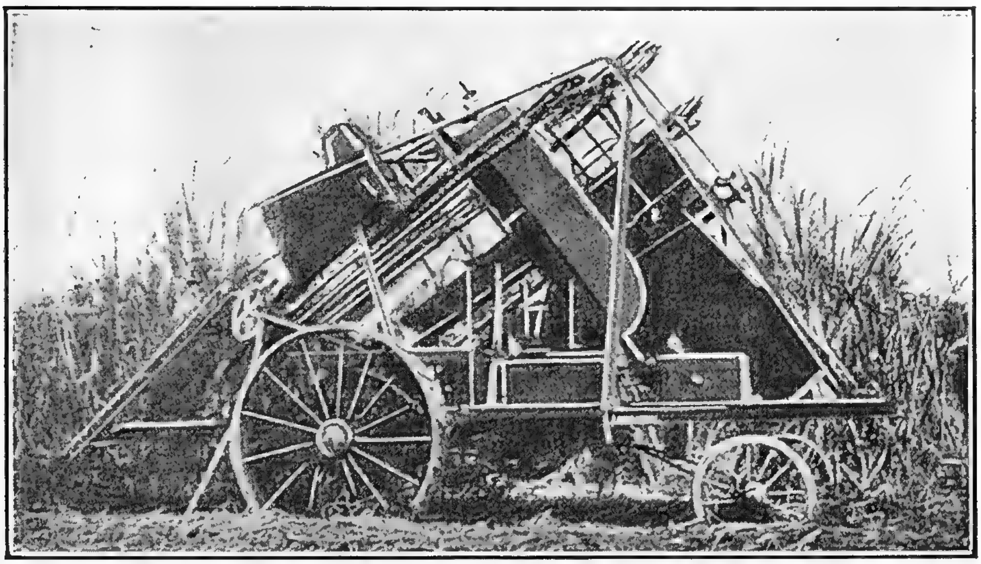


PLATE 29.—LUCE CANE HARVESTER IN THE FIELD.

sometimes breaking off, and at that point disc cutters are arranged so that all of the canes are cut at the desired point thus attained. It struck us that in this point Mr. Luce has made a wonderful display of inventive ingenuity, and it seems to be the solution of that most vexed problem of all, the cutting of the canes properly at the top. When we recognise the fact that our sugar-canes vary in length of ripe cane from 5 to 10 feet, more generally, say, from 5 to 8 feet, after the top is off, we can appreciate Mr. Luce's achievement. These canes thus topped have in the meantime been stripped by the spring whips that move in reverse direction from the movement of the cane.

THE LUCE CANE HARVESTER.

" The final delivery of the canes is down an open chute, forming a continuous wind-row.

"We especially inquired as to any control of the cutting apparatus as to height. Ordinarily plant canes or highly fertilised canes might give canes varying from 6 to 10 feet in length, while stubble canes and canes less well fertilised might run from 5 to 7 feet in length. We noted at once that there was an arrangement to shift from one length to another, just as readily as an automobile may have its speed changed. This, however, still leaves the Luce machine cutting the cane at the last ripe joint, whether the canes be long or short, as the bending of the top of the cane becomes a gauge point to determine their approach to the cutting discs of the topping part of the machine. It is stated that Mr. Luce has expended 100,000 dollars (£20,000) in developing his machine up to its present condition."

In a notice of the machine in the April issue of the "Queensland Sugar Journal," that Journal says:—

"The Southern Pacific Company has been so impressed by the work of the machine at Clotilda that in preparing their exhibit for the San Francisco Exhibition, they have included some moving pictures of the Luce cane harvester. These pictures show the Luce harvester cutting cane that averaged 35 tons to the acre. In this cane, it was cutting, stripping, and topping the stalks satisfactorily at the rate of 200 tons per day.

"Generally speaking, the machine is a combination of tractor and harvester. That is to say, the machinery for harvesting the cane can be lifted off after the grinding season is over, and this leaves the rest of the machine in the form of a tractor, which may be used for ploughing, cultivating, road making and grading, and for other work about the plantation. Thus, the machine is an all-the-year-round worker.

"The 'tractor' part of the outfit runs on its own rails—or, in other words, the traction is of the caterpillar type, made world famous lately by the pictures of the big guns being used in the European war. This enables the machine to travel over ground which would be impassable for either mules or horses.

"The cane is severed much closer to the ground than is the case with hand cutting, an average of from 4 to 5 inches of the richest part of the cane being added to each available stalk, and the cut is clean and square. The topping is done by rapidly-revolving knives, and by a simple but ingenious device the stalks are topped accurately, whether they are of a uniform length or not.

"Stripping is done by flexible steel fingers attached to the edges of flat, slab-like shafts, and the construction of these shafts acts as a fan that clears the trash as it is stripped from the stalk.

"Fallen cane is picked up and brought against the cutting knives as though it had always been straight, and had never fallen. This, and the design of the cutting mechanism, is the reason for the machine's successful operation in heavy cane.

"Two men are required to operate the machine, which will cut, top, and strip from 150 to over 200 tons of cane per day. Those who

have to search out and pay the ever-elusive plantation labour, can easily figure how many men can be released from actual harvesting for other work about the plantation by the use of this machine."

The illustrations appeared in the "Louisiana Planter," the second of which has been kindly loaned to us by the Editor of the "Queensland Sugar Journal."

EXPERIMENTS IN THE DESTRUCTION OF THE CANE GRUB.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Entomologist, Mr. E. Jarvis:—

"In November last a sample of dichlorbenzole which was imported by the Department of Agriculture from Germany before the war broke out was forwarded to me by the Sugar Bureau for experimental purposes. After trials I am inclined to think that it possesses efficient though temporary deterrent qualities.

"The following details will illustrate some of the methods employed in this investigation:—As a preliminary test six grubs were confined in a closed cage holding 54 cubic inches of sifted soil, with which had been mixed 15 grains of the deterrent (1 oz. to 1 cubit foot). After two and a-half days all larvæ were dead and partially rotten. This experiment was repeated on three subsequent occasions with similar results. On 27th February eighteen large grubs were placed in an open cage containing 1 cubic foot of unsifted soil infected with half an ounce of coarsely crushed dichlorbenzole. Thirty-six hours later three had succumbed, and the remainder were lying motionless as though paralysed, all dying in less than a fortnight. Tests were then applied to determine the effect on larvæ of isolated injections of the chemical in uncrushed form, administered at various depths, and these trials proving satisfactory it was decided to experiment in the open. A plot of red volcanic soil was accordingly dug 9 in. deep, a row of four-months'-old cane-stools planted, and on 5th March the land treated with a series of ¼-oz. injections 1 ft. apart in a straight line on each side of stools, 6 in. from same, and 7 in. in depth. About fifty grubs were then placed a couple of inches below the surface above injections, and the ground left undisturbed for a fortnight. At the expiration of that period a faint odour of dichlorbenzole was perceivable in the soil at a distance of 15 in. from injections, and strongly impregnating to the full depth of digging a strip of land 2 ft. wide. Examination revealed the presence of a few dead grubs only, the living ones having evidently been driven from the infected area. The cane plants continued perfectly normal, and were rooting freely. With a view to determining the action of the chemical on larvæ compelled to remain under its influence, a plot of ground was prepared on 3rd April by being dug 9 in. deep, allowed to settle for a few days, and treated with a single line of ¼ oz. injections placed 1 ft. apart and 5 in. beneath the surface. Grubs of the grey-back cane-beetle were then buried in the soil at various distances from the chemical, each larva being confined in a specially designed cage that, whilst preventing extended movement in a horizontal

direction, allowed it to descend vertically to a depth of 9 in. or ascend to within an inch of the surface, and at the same time ensured continuous natural conditions with respect to drainage, moisture, temperature, &c. Examined on the 12th instant (nine days later), the soil was found more or less impregnated with the odour of the deterrent to a distance of 1 ft. on each side of injections. Larvæ placed at distances of 6 and 8 in. were dead and discoloured, those at 9 in. dying but able to move convulsively, and those 1 ft. away alive and apparently healthy. Grubs situated 9 in. from the chemical succumbed on the 18th instant (after fifteen days); whilst those 1 ft. distant, and control specimens, continued unaffected throughout the experiment. This test was repeated later with practically identical results; and further trials, in which the injections were reduced to 80 grains placed 1 ft. 6 in. apart, also proved satisfactory.

With reference to the rate of evaporation of dichlorbenzole, I observed that in dry weather a quarter of an ounce, after being fifteen days underground at a depth of 7 in., subjected to an average temperature of 69 degrees F., weighed 3 scruples 5 grains, thus indicating a loss of nearly 50 per cent., but did not actually disappear until the end of six weeks. Better results could doubtless be obtained from injections made of a single lump like a "moth-ball," as in this form the same amount of chemical might last two months or longer, and its application would be simplified. Under wet conditions both evaporation and soil infection were retarded.

It is worth noting, however, that the deterrent odour remained in the ground long after all traces of its origin have vanished. Soil under cane-stools treated 5th March was found to be strongly infected on the 8th of May, three weeks after complete evaporation, from which we may reasonably assume that a limited area of such contaminated soil—comprising, say, a strip at least a foot wide—would continue repellant until the odour became less decided.

Dichlorbenzole is sold in the form of irregularly-shaped crystalline nodules possessing a somewhat pungent odour not unlike that of benzine, and differs from napthalene in being semi-transparent, duller in colour, and not flaked.

It is unfortunate that this article is at present unprocurable. The price was stated to be 6d. per lb., and at this rate it would cost £1 10s. to treat an acre with injections of 80 grains placed 1 ft. 6 in. apart under each row of cane; or £2 4s. for the same number of ¼-oz. injections. Dichlorbenzole should also prove serviceable as a repellant against oviposition, it being exceedingly improbable that the adult beetle would either enter or deposit eggs in soil contaminated with an odour fatal to its offspring. This is likely to be matter of exceptional interest for future investigation.

This report has been made and the experiments undertaken as a matter of general interest to canegrowers, but other experiments may, of course, prove disappointing, in view of the fact that success will be dependent to some extent on varying conditions of porosity due to the physical composition of soils, and influenced by different modes of cultivation and drainage.

Botany.

PLANTS POISONOUS TO STOCK.

By FRANK SMITH, B.Sc., F.I.C. and C. T. WHITE.

Dysphania myriocephala, *Benth.* (N. O. Illecebraceæ).

The uncertainty in many instances attaching to the definite ascribing of poisonous properties to suspected plants is attributable to various causes—the frequent absence of correct diagnosis, the difficulty of determining the harmful individual in mixed pasture, and the variation in degree of toxiety at different stages of growth.

Uncertainty can be rendered certainty by two methods of attack—the experimental feeding of animals upon the suspected plant, or by establishing by chemical examination the presence therein of principles the physiological effect of which can be foretold.

Various specimens of the weed *Dysphania myriocephala* (N. O. Illecebraceæ), despite its close alliance to the wholesome amanths (Amarantaceæ) and salt bushes (Chenopodiaceæ), have been found by the writers to contain both an amount of hydrocyanic acid yielding substance (a glucoside) and an alkaloid. The former has the property of yielding on disintegration and destruction of the cells by the digestive apparatus the powerful poison hydrocyanic (prussic) acid; the latter, to which class the drugs strychnine, morphine, atropine belong, would undoubtedly exercise marked physiological effect. The plant is, therefore, to be regarded as a virulent stock poison. Indeed, this role has already been assigned it, as the following references will show:—

Bailey and Gordon, in "Plants Reputed Poisonous to Stock" (1887), write:—"A specimen of this plant was forwarded from the north-western portion of the Warrego district, where the drover in charge stated that he lost thirty rams out of a small flock, deaths taking place immediately after the first appearance of the symptoms."

In June, 1914, Mr. M. Hayward, manager of Comongin South, Thargomindah, forwarded specimens to the Colonial Botanist with the following remarks:—"I am sending for examination a sample of a plant which I have reason to believe poisoned eight head of cattle here. The cattle are all dead within a radius of 20 yards, and appear to have died without a struggle. There is a patch of weed on which they had been feeding right alongside them."

The weed is found chiefly in the inland portions of the State, and, despite a fairly wide occurrence, the writers are not aware of any local or common appellation. Its presence has also been noted in the Brisbane district, though whether native or introduced from some Western locality it is impossible to say, and quite recently it was observed growing in great profusion in a suburban fowl-run, strange to say practically the only green stuff left standing in the area.

A brief description of the plant, together with a plate, will aid in its identification.

Dysphania myriocephala is a small diffuse or procumbent herb with branching ascending stems rarely more than 6 or 7 inches high. It has numerous small linear leaves in the axils of which are borne the greenish flower clusters. The clusters of flowers are small and globular, each containing 10-20 or even more minute flowers, and often occupy the greater part of the plant. The seed is minute, ovoid, dark-coloured, and slightly flattened.

PLATE 30.—DYSPHANIA MYRIOCEPHALA, *Benth.*

Entomology.

A FRUIT FLY ATTACKING PAPAW FRUITS.

The "Agricultural News" of Barbados (27th March) contains the following article on the Papaw Fruit Fly, which was published in the "Journal of Agricultural Research" for 21st September, 1914, a journal issued by the U.S. Department of Agriculture:—

"The Papaya of the Southern United States is the West Indian Papaw (*Carica papaya*), and as this plant has some importance from an economic point of view in certain of these islands, a brief abstract of the paper mentioned above, which appears under the joint authorship of Messrs. Frederick Knab and W. W. Yothers, may be of interest to readers of the "Agricultural News."

"The insect which forms the subject of this paper is *Toxotrypana curvicauda*, Gerstaecker. It was first brought to the notice of the U.S. Department of Agriculture in 1905, when it was bred from a maggot-infested papaw fruit, from the Subtropical Plant Introduction Field Station at Miami, Florida. Since that time, the increasing importance of the papaw as a possible commercial crop has led to investigations in connection with this insect.

"The papaw fruit fly is now recorded as occurring in the southern part of Florida, in Costa Rica, Yucatan, Brazil, Peru, Porto Rico, Bahamas, and St. Jean (? St. Jan), Danish West Indies. It is stated that this last record has been erroneously given as St. John, Antigua.

"*Description—the Adult.*—The papaw fruit fly (*Toxotrypana curvicauda*) belongs to the dipterous family Trypetidæ, and exhibits a certain superficial resemblance to a common brown wasp (Polistes). This is due not only to its similarity of size, form, and general colouration, but in life this is accentuated by the manner in which it walks about on the fruit, with its body well elevated upon its slender legs, and by a certain nervousness of movement. The female is remarkable for its long and slender curved ovipositor, which exceeds the length of its body.

"*The Eggs.*—The eggs were procured from gravid females by dissection. The number of eggs produced by a single female appears to be slightly in excess of 100; the counts from two females, both showing a distended abdomen and probably containing a nearly full complement of eggs, gave 103 fully developed eggs in each case. No eggs in process of development were present, which indicates that all the eggs are disposed of within a short period.

"*The Larva.*—The larvæ are shining, dirty, greenish-white in colour while feeding upon the interior seed mass. Larvæ that have matured within the ripened fruit, and that have penetrated into the meat, are the same rich golden-yellow colour as the ripe fruit.

"*Habits of the Larvæ.*—The larvæ of the papaw fruit fly occur in the interior of the fruit, first feeding in the central seed mass, but later, as they mature and the fruit ripens, working into the meat and ruining the fruit. The number of larvæ in a single fruit varies from two or

three to twenty or more. Sometimes larvæ of different sizes occur in the same fruit at the same time, showing that the infestation was from more than one oviposition.

"Cultivated fruit has been found to be generally less infested than that growing wild, and this is ascribed to the fact that the flesh of the cultivated fruits is usually thicker, the thin-fleshed varieties appearing to be more generally attacked. It seems that the eggs are deposited inside the seed cavity, or at least the insects develop best when this happens. Thick-fleshed fruits often showed numerous scars, indicating attempts at oviposition, when no injury to the seed mass or the flesh occurred to indicate the feeding of the larvæ. On the other hand, fruits were noticed, in which fully-grown larvæ were found dead. This is explained as being the result of an attack on fruits which were too young. The contact with the juice of the unripe fruit is quickly fatal to the larvæ. It is evident that the fruit was too young when attacked, and that the maggots became fully grown and attempted to penetrate into the flesh before it was sufficiently ripened, and they were killed by contact with the juice. In the ripe fruit the flesh is softer, and the gummy juice is no longer exuded.

" *Pupal Period.*—The larvæ when full grown usually leave the fruit and fall to the ground, where they pupate, under some bit of rock or buried in the soil at a depth of 1 or 2 inches.

"The length of the pupal period is given as seventeen to twenty-one days in Porto Rico, and from thirty to forty-two days in Florida. The latter figures were obtained as the result of observations in the cool season of the year.

"*Habits of the Adult and Oviposition.*—The adults of this species appear only for a short time just before sunset. A female fly was observed to alight on a well-developed but unripe fruit. After walking about a little she inserted the ovipositor its full length into the fruit. As soon as the rind was punctured, the milky juice which the unripe fruit exudes whenever injured welled forth and began to trickle down over the surface. It is evident that the female fly endeavours to thrust her ovipositor through the flesh to deposit the eggs in the central seed cavity, and that it is only in those varieties with the thinner-fleshed fruit that this is successfully accomplished. The larvæ are always found in the seed mass, except when they are full grown and the fruit is ripe, when they penetrate into the flesh with the object of working their way to the outside in order to get to the ground and pupate.

"*Food Plants.*—Up to the present time no other fruit than the papaw has been recorded as being attacked by this insect, and all attempts to induce the larvæ to feed on other fruits have, so far, failed.

"*Rapid Increase of the Fruit Fly.*—During the last two years the papaw fruit fly has rapidly increased in abundance, and has extended its range so as to threaten seriously the future development of the papaw industry in Florida. This is largely a result of the increased cultivation of the papaw in the southern part of the State. Some varieties of Philippine stock producing large fruits are apparently free from attack.

"*Control.*—It has been pointed out that fruit with very thick meat escapes infestation. While the papaw fruit fly attempts to oviposit on such fruit, the thickness of the meat prevents the tip of the ovipositor from reaching the seed cavity, and in the meat itself the larvæ cannot live. It was further found that in some fruits the larvæ had reached maturity before these had ripened, and had been killed by the sticky juice of the green fruit in endeavouring to escape. The means of control that now seem valuable are the production of varieties of papaw that have thick meat and that ripen slowly, and the conscientious destruction of adventitious or wild papaw plants and of all infested fruits. All plants with inferior fruit should be eliminated."

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING APRIL, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	April.	No. of Years' Records.	April, 1915.	April, 1914.
North Coast.	In.		In.	In.
Atherton	4·73	13	0·59	3·01
Cairns	13·23	27	3·44	11·53
Cardwell	9·94	27	4·33	7·04
Cooktown	8·99	27	7·73	13·29
Herberton	4·61	27	0·32	3·54
Ingham	9·11	22	3·81	8·38
Innisfail	23·44	27	9·15	22·29
Mossman	16·78	5	2·48	13·01
Townsville	3·66	30	0·62	4·89
Central Coast.				
Ayr	2·86	27	0·48	4·86
Bowen	2·82	27	0·69	3·18
Charters Towers ...	1·90	27	0·67	2·64
Mackay	6·33	27	2·10	4·98
Proserpine	6·96	11	4·12	4·65
St. Lawrence ...	2·91	27	0·06	1·48
South Coast.				
Biggenden	1·73	14	0·65	2·00
Bundaberg	3·06	27	0·44	2·55
Brisbane	3·62	64	2·41	0·42
Childers	2·52	19	0·11	0·87
Crohamhurst ...	5·22	22	1·30	0·53
Esk	2·65	27	1·91	1·85
Gayndah	1·47	27	1·36	1·48
Gympie	3·19	27	0·58	2·20
Glasshouse M'tains	4·52	6	3·19	0·79
Kilkivan	1·97	27	0·86	0·85
Maryborough ...	3·35	27	1·01	2·00
South Coast—continued:	In.		In.	In.
Nanango	1·98	27	0·96	0·94
Rockhampton ...	2·40	27	0·02	0·88
Woodford	4·09	27	2·15	0·51
Yandina	4·55	21	2·67	3·31
Darling Downs.				
Dalby	1·56	27	0·44	0·86
Emu Vale	1·21	17	0·79	1·08
Jimbour	1·48	24	1·16	0·33
Miles	1·47	27	0·96	2·65
Stanthorpe ...	1·58	27	2·09	2·88
Toowoomba ...	2·60	27	1·00	2·44
Warwick	1·36	27	0·72	1·94
Maranoa.				
Roma	1·27	25	0·98	1·88
State Farms, &c.				
Gatton College ...	1·84	14	1·38	1·53
Gindie	1·42	13	0·08	1·31
Kamerunga Nurs'y	13·03	23	3·52	9·06
Kairi	2·24	2	0·82	3·65
Sugar Experiment Station, Mackay	5·07	16	2·57	5·67
Bungeworgorai ...	Nil	Nil	·50	1·74
Warren	1·19	2	Nil	2·38
Hermitage ...	1·32	7	0·80	2·03

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

General Notes.

DRESSING FOR SEED WHEAT.

We have frequently given directions in this Journal for dressing seed wheat as a preventive of bunt or smut, but the pickling of the seed either with bluestone or formalin, followed by immersion in lime water, affords no protection against the depredations of birds. Although we are inclined to be sceptical as to the value of new patents, yet here is one we have just received from London which, under the name of "Corvusine," appears to have been largely used and much approved of by well-known farmers in England. It is claimed for this dressing that less seed can be sown per acre, that more vigorous plants are obtained, and, consequently, heavier crops, and that no birds or vermin will touch seed dressed with it, so that the whole of the seed sown is left to germinate, and two bushels per acre of reliable wheat are ample to produce a heavy and full crop. The cost of dressing wheat with Corvusine is stated to be 3d. per bushel, or 6d. per acre. Where birds have made vitriol-dressed wheat very thin in places, that dressed with this compound is said to be not touched by them. It does not injure the seed. In the case of maize, crows will wait till the green shoots appear, and then go down and play havoc with the plant. Neither fowls nor pigeons nor crows, it is claimed, will touch the seed once having tasted the grain. Should this be authenticated, as would appear by the testimonials in its favour, then the depredations of bandicoots in our Queensland maize fields would come to an end. The address of the proprietor, as stated on the circular we have received, is A. E. Hawker, 59 Mark Lane, London, E.C.

DOGS IN WAR.

The following interesting note on the use of dogs in war time in France appeared in "Animalia" in the "British Live Stock Journal" for 26th February last:—

"Mr. Ian Malcolm, M.P. for Croydon, who for some months has been Director of the Wounded and Missing Department of the Red Cross Society, in a letter home states: 'There is a very interesting society in France, known as the "Ligue des Chiens Sanitaires," which trains dogs of all sorts, apparently, to carry despatches from one trench to another or to hunt for wounded men. They very kindly asked me to their training ground, and I am very glad that I went. There, in a large open space, were airedales, curly-coated sheepdogs, black Belgian collies (with a dash of the hyæna in them, I should say), and Scotch collies. They were all kennelled up and brought out one at a time for their lesson. In the field there were trenches and fences, pits and gravel mounds, obstacles of all kinds. The dogs were each at different stages of proficiency in the art of tracking wounded; some had begun learning that week; others

had been with the trainer for months, and one was a perfectly trained dog which the police had used for a couple of years.

'The latter was a little wonder; he could climb wire netting or a stone wall like a cat, and he had the nose and pace of a first-class pointer. It was beautiful to see him work. A man goes by devious paths and ultimately hides in a pit enclosed in a 15-ft. wire cage, like the walls of an aviary without the roof. The dog is brought on the ground by his trainer, picks up the scent almost at once, and off he goes. Finally he reaches the pit, makes three springs up the fencing, finds the man, takes his cap, and races back to his master. He is then put on a leash, and off he goes again at full speed, dragging the man with him as fast as his legs can carry him over the broken ground until he reaches the wounded soldier, who is then tended, and, if possible, brought back to the nearest field hospital. These dogs, I believe, are in general use in the French and German armies, but hitherto I fancy that there are few, if any, among our British regiments. It would be an interesting experiment to try some among our troops, who could certainly work the dogs, if any soldiers in the world could.' "

INSURANCE OF CONTENTS OF STACKS.

Why do not some farmers insure their stacks? We hear constantly of stacks and haysheds, the latter often adjoining a shed containing valuable agricultural implements, being destroyed by fire, but no insurance. Yet it is so easy to calculate the content of a stack of any crop that the wonder is that some farmers will not insure their stacks, the premium being really a mere bagatelle, based on the content—not on the material, which may be lucerne or any other crop. Every farmer should know how to calculate the weight and consequent value of the stacked crop. There is no difficult arithmetical problem needed to arrive at this. Any 4th class schoolboy can work it out.

The weight of hay per cubic yard in the stack varies from 112 lb. to 300 lb., depending on the nature of the hay, its age, the size of the stack, and the part of the stack taken.

Take the conditions of hay and stacks, and the number of cubic yards to a ton will approximately vary as follows:—

	Square Stacks. Cubic Yards.	Round Stacks. Cubic Yards.
If not well settled	12	13
If fairly well settled	10	11
If very compact	8	9

If the reader will refer back to the Journals, vols. IV., X., XII., and XIX., he will there find simple directions for calculating the weight of hay in a stack, and, knowing that, he can effect an insurance at a small premium, which will ensure him against any loss by fire, such as occurs frequently in a dry season like the present. A wise farmer will insure not only his life and his house, but his crops, implements, and stock.

The following table shows the number of cubic yards in a ton at different weights per cubic foot:—

Weight per Foot in lb.		Yards to a Ton.	
5·18 equals	16	7·50 equals	11
5·53 „	15	8·25 „	10
6·00 „	14	9·18 „	9
6·37 „	13	10·31 „	8
6·87 „	12	11·85 „	7

Having thus arrived at the weight of hay in the stack, and its market value, the owner can insure it at three-quarters of its estimated value.

DANGER IN POISONED PRICKLY-PEAR.

A letter was lately received by the Under Secretary for Agriculture and Stock, from a settler who lost a cow owing to its having eaten poisoned prickly-pear. The pear had been poisoned about four or six months previously, and was so decayed that practically only the fibre was left. He believed the poison was either arsenic or cyanide, probably both. The symptoms are: Legs becoming suddenly powerless; frothing at the mouth; badly scoured; death ensuing with great agony in about twenty-four hours.

As more of the cows appeared to be infected, he applied to the Department for information as to any treatment which could be applied. The cattle were grazing on dry Rhodes grass and in green belar scrub.

The matter being urgent, the Veterinary Department promptly wired a recipe for arsenical poisoning. As this is a very important matter as possibly affecting stockowners in districts where the pear has been killed by the poison, we give the recipe.

The veterinary surgeon to whom the matter was referred was of opinion that the symptoms described all pointed to arsenical poisoning; he recommended that the following mixture be made up, and that one wineglassful be given in half a pint of cold water morning and night:—

Dissolve 2 oz. washing soda in 1 pint of boiling water; add 1 oz. of strong, liquid perchloride of iron, and allow to cool. This mixture is the antidote for arsenical poisoning.

MEAD, OR HONEY BEER.

Boil 14 lb. of honey in 6 gallons of water for half an hour, breaking into it three or four new-laid eggs. Then add small bunches of flavouring from the garden, balm, thyme, &c., ½ oz. each of cinnamon, cloves, mace, and bruised ginger, and boil a quarter of an hour longer. Pour it out to cool, then toast a very large slice of bread of any kind, spread it over with fresh yeast, and put it into the liquor; let it ferment for a day, then put in the cask, but keep it open until the fermentation is complete. It may be bottled in a month, and the corks must be securely tied.—"Farm, Field, and Fireside."

RATS ON PLANTATIONS.

"L.A.W.," writing on this subject to the "Journal of the Jamaica Agricultural Society," describes a remedy for rats, which was given to him by an old cacao planter at Fellowship, who, he says, "informed me that seven years ago rats and rat bats played fits with his cocoa, and he tried the following experiment. Result, no rats or rat bats had come back again for seven years past. I being sceptical, he got a bit worked up and offered to bet £100 on the results, saying the rats would run from Fellowship to Moore Town and never return.

"The scheme is to build one or more wood fires ready for lighting on the windward side of the cocoa walk or cocoa field. At dusk on an evening with a steady breeze blowing, light same and throw on them 3d. frankincense, 3d. brimstone, 3d. sulphur, 3d. myrrh, the fancy ingredients, I suppose, and one quart of bird pepper, the real obeah. Then clear out or you repent it, and leave the rats and bats to enjoy the incense prepared for them. Results, he claimed, are exodus of rats and bats never to return. The question is, Is there anything in it? Three years ago cockroaches got into my new piano and began to make hay. I set some phosphorous paste and killed sixteen. From that day to this, three years, I have never seen one back in it. The news has been passed to the cockroach community that my piano is a bad place. If roaches have so much sense, what about rats? What price a trial?"

TO KEEP MICE FROM WHEAT BAGS.

Many farmers experience great difficulty in keeping their wheat bags free from the depredations of mice and rats, and the remedies tried are innumerable. A New South Wales farmer now states that if each of the bags is rubbed over with a few handfuls of sulphur, mice will never touch them, and the same procedure would probably answer in the case of rats. Bags thus treated have stood from stripping to sowing without a hole having been made in one of them.—"Pastoral Review."

GELIGNITE.

For the information of farmers and others who use explosives either for clearing or for subsoiling, Mr. J. B. Henderson, Chief Inspector of Explosives, states that, if gelignite is stored in a very damp box it would probably get into a dangerous condition. The moisture tends to drive the liquid nitro-glycerine out of the bulk of the explosive on to the paper wrapper, where it is distinctly visible. Crystals of saltpetre also tend to form on the outside of the wrapper when moisture affects the explosive. Unless there is some visible change of this kind, there is no other change likely to have occurred. Mr. Henderson, however, points out that explosives should be kept strictly under the provisions of "*The Explosives Act of* 1906" and Regulations of 1908, and, if kept in a permitted magazine, are not likely to get damp.

REMEDY FOR ZAMIA POISONING.

For cattle suffering from ricketts as the result of feeding on the zamia plant, the following remedy is recommended by the veterinary officers of the Department of Agriculture and Stock:—

Give 1 lb. Epsom salts in 1 quart tepid water, and follow twice daily with 2 drachms iodide of potassium in 1 pint of water.

GOOD GRASSES FOR DAIRYING.

Rhodes grass is recommended by Mr. Brooks, Agricultural Instructor, for the drier portions of a district, and West African Wonder (*Panicum muticum*) for low-lying situations. The latter is propagated by cuttings. It may be pointed out that the feeding value of paspalum can be vastly increased by a mixture of white clover, more especially during the winter months.

MORTALITY AMONGST YOUNG PIGS.

A correspondent lately wrote to this Department describing certain symptoms amongst his young pigs which resulted during six months in the death of twenty. The principal symptom was a dragging of the hind legs, when they lay about unable to rise but yet not going off their feed for two or three months before dying.

The case was submitted to one of the Government veterinary surgeons, who stated that the trouble was due either to rheumatism or worms in the kidney. If from the first cause, the animals should be kept dry, and away from draughts. A wooden floor should be placed about 1 foot from the ground, so that the animals would be kept comfortable. If from the second cause, 2 drs. of turpentine and 1 pint of sweet milk should be given daily for a week.

ANTIDOTE FOR ARSENICAL POISONING.

Dissolve 2 oz. washing soda in 2 oz. boiling water; filter same through a piece of blotting paper; then add 1 oz. strong perchloride of iron; and give half this dose morning and night.

Answers to Correspondents.

H. E. A. MINCHIN, Warrawoona, Evelyn—

The following answers to your various questions were given by the respective officers of the Department to whom they were submitted:—

Government Entomologist and Vegetable Pathologist (Mr. H. Tryon).—

Q. Can arsenate of lead be mixed with Bordeaux mixture?

A. Yes.

Q. Does arsenate of lead keep indefinitely?

A. This depends if kept away from chemicals that reaction it, but it is naturally a very stable compound.

Architect and Surveyor (Mr. A. Morry).—

Q. How should a varnish brush be kept?

A. Varnish brushes, when in constant use, should be kept from the air; they should not be left in the varnish during prolonged interruptions to work, but should be suspended in water, turpentine, or in kerosene, the bristles only being submerged without resting on the bottom, to prevent them turning up at the ends.

When work is finished, they should be carefully washed in soap and hot water if oil varnish, in turpentine or kerosene if spirit varnish, dried and put away. If not perfectly cleaned, oxidation takes place through exposure to the air, and the bristles are spoiled for future use. If brushes have become hard, wash them in hot turpentine in a frying-pan over a stove, or soak for some time in kerosene.

Q. Is there any way of preparing glue so that veneer work, &c., will not come apart in damp weather?

A. Glue may be made waterproof by mixing with it about 1 per cent. of bichromate of potash, which is 1 oz. to 6¼ lb. of glue. The bichromate should be dissolved in hot water, and the glue boiled in same. Too much bichromate will make it a yellow colour, and will not be effective; try half the quantity first and increase if necessary.

Poultry Expert, Gatton College (Mr. Hindes).—

Q. *Re* the shedding system of keeping hens: Does the thick layer of fresh horse dung effectively and healthfully do away with all smell and unpleasantness from the hens' droppings? What substitute could be used for this purpose in a place where fresh horse dung could not be obtained in a sufficient quantity?

A. There will be no bad smell for the first month; as soon as there is, the horse manure should be cleaned out and fresh material put in. Any rough grass or straw can be used instead of horse manure.

Q. *Re* "Hogan" system of poultry keeping: Could you furnish me with any details as to this (and others) intensive system?

A. The "Hogan" system is a secret for testing laying pullets, and can be purchased from any of his agents; it has nothing to do with intensive or any other system of poultry keeping. The method of carrying out the "Hogan" test can be bought from the "Poultry Bulletin," 200 Castlereagh street, Sydney, N.S.W. I have had no practical experience with any intensive system. There is a "Gordon" system (intensive), also a secret, which is sold by Mr. F. E. A. Gordon, care of G.P.O., Brisbane.

Q. What is the next best substitute for wheat as a poultry food?

A. Good heavy short oats, maize, barley, Kaffir corn, peas. Feed any of the above that may be procurable, giving as much variety as possible.

Agricultural Chemist (Mr. J. C. Brünnich).—

Q. Can laundry water containing soap and washing soda be safely used to water plants? If not, is there any inexpensive corrective?

A. Such water should not be used, or only very sparingly. There is no simple chemical corrective.

Q. Can laundry water containing soap and borax be safely used to water plants? If not, is there any inexpensive corrective?

A. The previous answer applies also to this question.

Q. Can "blue" water from a laundry be safely used to water plants? If not, is there any inexpensive corrective?

A. Yes, can be used.

Q. Why is rain so much more beneficial than irrigation? Does rain contain any appreciable amount of ammonia? To what extent can the spray systems of irrigation be compared with rain, especially as regards aeration?

A. The difference is partially due to considerable amounts of nitrogenous compound in rain water. It is not the aeration which would make the difference; even spray irrigation will not replace rain.

INDIGESTION IN COWS.

Indigestion and scours may be due to the nature of the pastures. When the disorder is first noticed, ½ lb. Epsom salts should be given, followed daily with ½ oz. prepared chalk. This can be had from any chemist.

There is no cure for hair balls in calves.

RICE HULLER.

" LUXMI," Cairns—

The " Luxmi " rice huller is made by Messrs. Ruston, Procter, and Co., Ltd., Lincoln, England. The weight of the machine is 5 cwt. It is guaranteed to deliver thirty bags of clean white rice in ten hours. In actual work in India, one of these machines is said to have turned out sixty bags in ten hours. We cannot tell you the price of the machine, but advise you to communicate with the makers.

SUNFLOWER CULTIVATION.

M.A.F., Kaimkillenbun.

With further reference to your letter of 26th April on the subject of Sunflower-growing, the Department has now a pamphlet on Sunflowers in the press, which will shortly be available. Meanwhile, for your information, Messrs. Chas. Taylor, seed merchants, Roma street, Brisbane, are purchasers of seed. We advise that you write to them as to price, &c. The seed runs from 30 to 35 lb. per bushel.

WORMS IN COW'S PAUNCH.

A correspondent at Mount Garnet writes describing a worm about half an inch long which, during very dry weather, appears in the honeycomb part of the paunch of many cattle, and asks for a remedy.

Two oz. oil of turpentine in 1 pint of raw linseed oil should be given on an empty stomach, followed daily with a powder consisting of 2 drs. sulphate of iron and 4 drs. powdered gentian. This should be given in a bottle of gruel, and the treatment continued for a week.

SPRAY WASH FOR VEGETABLES.

"SPRAY," Tiaro—

The spray mentioned by you was published in this Journal in May, 1903. As it is possible that you may not have been a subscriber at that date, we again give it:—

The spray, or wash rather, was declared by Mr. S. C. Voller, then Assistant Instructor in Fruit Culture to the Department of Agriculture in this State, to be an infallible means of destroying aphis and other insect life on vegetables. The trouble with Paris green is, that it will not stick to the glossy leaves of cabbages and cauliflowers, but collects at the base of the stalk and at the junction of the stalk and leaves. Sprays are open to the same objection. The following wash, however, will stick like varnish, and in an instant destroy all animal life on the plants:—

Take 20 lb. of resin, 4 lb. caustic soda (98 per cent.), or 6 lb. (70 per cent.), 3 pints of fish oil or 2½ lb. whale oil soap, and 140 to 150 gallons of water. Place all the above ingredients in a boiler with 20 gallons of the water, and let the whole simmer for three hours. Then add hot water slowly, and stir well till there are at least 40 gallons of solution. Then add cold water to make up the 140 or 150 gallons. Never add cold water when cooking. This wash, using only 80 gallons of water, will destroy the mussel, glover, and white scales on citrus trees, and the mussel scale of the apple.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1915.

Article.		MAY. Prices.
Bacon	lb.	9½d. to 11½d.
Bran (Mill price)	ton	...
Butter	cwt.	194s.
Chaff, Mixed	ton	£7 5s. to £8 10s.
Chaff, Oaten	"	£6 to £10
Chaff, Lucerne	"	£6 5s. to £8
Chaff, Wheaten	"	£4 to £4 10s.
Cheese	lb.	1s.
Flour	ton	...
Hams	lb.	1s. 1d.
Hay, Oaten (Victorian)	ton	£15
Hay, Lucerne (Prime)	"	£6 5s. to £7
Honey	lb.	3d. to 3½d.
Maize	bush.	5s. 3d. to 5s. 4d.
Oats	"	6s. 6d.
Onions	ton	£8 10s. to £9
Peanuts	lb.	2½d. to 3d.
Pollard (Mill price)	ton	...
Potatoes	"	£5 to £7 10s.
Potatoes (Sweet)	cwt.	4s.
Pumpkins	ton	£4 to £5
Eggs	doz.	1s. 6d. to 2s. 6d.
Fowls	pair	2s. 6d. to 4s. 3d.
Ducks, English	"	3s.
Ducks, Muscovy	"	3s. 6d. to 4s. 6d.
Turkeys (Hens)	"	5s. to 6s.
Turkeys (Gobblers)	"	7s. to 12s. 6d.
Wheat (Seed)	bush.	7s. to 7s. 6d.

VEGETABLES.

Cabbages	per dozen	5s. to 7s.
Peas	per sugar bag	4s. to 6s.
Beans	" "	4s. to 7s 6d.
Parsnips and Carrots	per dozen bunches	9d. to 1s.
Cucumbers	per dozen	9d. to 1s. 6d.
Custard Marrows	"	3s. 6d. to 5s.
Vegetable Marrows	"	3s. 6d. to 5s.
Beetroot	per dozen bunches	8d. to 1s.
Chocos	per quarter-case	1s. 6d. to 2s. 1d.
Sweet Potatoes	per cwt.	2s. 6d.
Table Pumpkins	per dozen	5s.
Tomatoes	per quarter-case	3s. to 4s. 6d.
Lettuces	per dozen	9d. to 1s.

SOUTHERN FRUIT MARKETS.

Article.	MAY. Prices.
Bananas (Queensland), per case	12s. to 15s.
Bananas (Fiji), per case	21s.
Bananas (G.M.), per case	14s. to 18s.
Mandarins	5s. to 9s.
Oranges (Navel), per case	7s. to 10s.
Oranges, Italian, per case	...
Oranges (Other), per case	5s. to 6s.
Passion Fruit, per half-case	1s. to 4s. 6d.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	9s. to 12s.
Pineapples (Ripleys), per case	8s. to 12s.
Pineapples (Common), per case	8s. to 10s.
Tomatoes, per half-case	3s. 6d. to 5s. 6d.
Persimmons, per half-case	...

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MAY. Prices.
Apples (American), Eating, per case	7s. to 8s. 6d.
Apples (Local), per case	6s. to 7s.
Apples, Cooking, per case	6s. to 9s.
Bananas (Cavendish), per dozen	2½d. to 4½d.
Bananas (Sugar), per dozen	3d. to 4d.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	3s. to 4s.
Lemons (Local), per case	2s. to 5s.
Lemons (Italian), per case	...
Mandarins (Northern), per case	3s. to 3s. 6d.
Oranges (other), per case	2s. 3d. to 3s.
Papaw Apples, per quarter case	1s. 6d. to 3s. 6d.
Passion Fruit, per quarter-case	2s. to 4s.
Peanuts, per pound	2½d. to 3d.
Pears (Victorian), per case	6s. to 10s.
Rosellas, per sugar bag	1s. 6d. to 3s.
Pineapples (Ripley), per case	7s. to 8s. 6d.
Pineapples (Rough), per dozen	2s. to 3s. 6d.
Pineapples (Smooth), per dozen	5s. to 6s.
Tomatoes, per case	1s. 6d. to 5s.

TOP PRICES, ENOGGERA YARDS, APRIL, 1915.

Animal.	APRIL. Prices.
Bullocks	£13 7s. 6d. to £16 10s.
Cows	£10 15s. to £12 7s. 6d.
Merino Wethers	22s. 9d.
Crossbred Wethers	23s.
Merino Ewes	18s. 3d.
Crossbred Ewes	25s. 3d.
Lambs	21s.
Pigs (Porkers)	45s.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	MAY.		JUNE.		JULY.		AUGUST.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·17	6·31	5·0	6·39	5·3	6·30	5·18
2	6·14	5·16	6·31	5·0	6·39	5·3	6·30	5·18
3	6·15	5·15	6·32	5·0	6·39	5·3	6·29	5·19
4	6·15	5·14	6·32	5·0	6·40	5·4	6·28	5·20
5	6·16	5·13	6·33	4·59	6·40	5·4	6·27	5·21
6	6·17	5·12	6·33	4·59	6·40	5·4	6·27	5·21
7	6·17	5·12	6·34	4·59	6·40	5·5	6·26	5·21
8	6·18	5·11	6·34	4·59	6·40	5·5	6·25	5·22
9	6·18	5·11	6·34	4·59	6·40	5·5	6·24	5·22
10	6·19	5·10	6·35	4·59	6·40	5·6	6·24	5·22
11	6·19	5·10	6·35	4·59	6·39	5·6	6·23	5·23
12	6·20	5·9	6·35	4·59	6·39	5·6	6·23	5·23
13	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·24
14	6·20	5·8	6·36	4·59	6·39	5·7	6·21	5·25
15	6·21	5·8	6·36	5·0	6·38	5·8	6·20	5·26
16	6·21	5·7	6·36	5·0	6·38	5·8	6·19	5·26
17	6·22	5·6	6·37	5·0	6·38	5·9	6·18	5·26
18	6·22	5·5	6·37	5·0	6·37	5·10	6·17	5·27
19	6·23	5·5	6·37	5·0	6·37	5·11	6·16	5·27
20	6·23	5·4	6·38	5·0	6·36	5·12	6·15	5·27
21	6·24	5·4	6·38	5·0	6·36	5·12	6·14	5·28
22	6·24	5·4	6·38	5·0	6·36	5·12	6·13	5·28
23	6·25	5·3	6·38	5 0	6·35	5·13	6·12	5·29
24	6·25	5·3	6·38	5·1	6·35	5·13	6·11	5·29
25	6·26	5·3	6·39	5·1	6·35	5·13	6·10	5·30
26	6·26	5·2	6·39	5·1	6·34	5·14	6·9	5·30
27	6·27	5·2	6·39	5·2	6·34	5·14	6·8	5·31
28	6·28	5·2	6·39	5·2	6·33	5·15	6·7	5·31
29	6·29	5·1	6·39	5·2	6·32	5·16	6·6	5·32
30	6·30	5·1	6·39	5·3	6·31	5·17	6·5	5·32
31	6·30	5·1	...	...	6·31	5·17	6·5	5·33

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H. M.
6 May	☽	Last Quarter	3 22 p.m.
14 „	●	New Moon	1 31 „
22 „	☾	First Quarter	2 50 „
29 „	○	Full Moon	7 33 a.m.

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

5 June	☽	Last Quarter	2 32 a.m.
13 „	●	New Moon	4 57 „
21 „	☾	First Quarter	12 24 „
27 „	○	Full Moon	2 27 p.m.

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

4 July	☽	Last Quarter	3 54 p.m.
12 „	●	New Moon	7 30 „
20 „	☾	First Quarter	7 9 a.m.
26 „	○	Full Moon	10 11 p.m.

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m., and at its nearest on the 24th at 3·24 p.m.

3 Aug.	☽	Last Quarter	7 27 a.m.
11 „	●	New Moon	8 52 „
18 „	☾	First Quarter	12 17 p.m.
25 „	○	Full Moon	7 40 a.m.

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be checked by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed drilled, or 15 to 16 lb. broadcast, will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also, rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, canaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions, it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and turmeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salisify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops. Sow Guada beans (snake gourd) at the end of September.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolor, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

Orchard Notes for July.

THE SOUTHERN COAST DISTRICTS.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphide of soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunks or the branches at or near where they form the head of the tree, is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay the eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following month, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

THE TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt, as may be wished. See that this spraying is thoroughly carried out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there, and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.